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ABSTRACT

This report is a recommendation for passage of Senate bill S.4, the National Competitiveness Act of 1993, with an amendment. The purpose of this bill is to promote the industrial competitiveness and economic growth of the United States by strengthening and expanding the civilian technology programs of the Department of Commerce and amending the Stevenson-Wydler Technology Innovation Act of 1980 to enhance the development and nationwide deployment of manufacturing technologies and authorizing appropriations for the Technology Administration of the department. The report discusses background and needs, the overall U.S. position in advanced technology, applications of high performance computing and networking, legislative history, summary of major provisions, estimated cost, and regulatory impact statement. A section-by-section analysis of the bill follows. Other contents include additional views of Senator Larry Pressler and a run-down of all the changes in existing law that would be made by the bill. (YLB)

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Calendar No. 165

103D CONGRESS *1st Session*	SENATE	REPORT 103–113

NATIONAL COMPETITIVENESS ACT OF 1993

Mr. HOLLINGS, from the Committee on Commerce, Science, and Transportation, submitted the following

REPORT

OF THE

SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

together with

ADDITIONAL VIEWS

ON

S. 4

U.S. DEPARTMENT OF EDUCATION
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SENATE

REPORT
103–113

NATIONAL COMPETITIVENESS ACT OF 1993

JULY 28 (legislative day, JUNE 30), 1993.—Ordered to be printed

Mr. HOLLINGS, from the Committee on Commerce, Science, and Transportation, submitted the following

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[To accompany S. 4]

The Committee on Commerce, Science, and Transportation, to which was referred the bill (S. 4) to promote the industrial competitiveness and economic growth of the United States by strengthening and expanding the civilian technology programs of the Department of Commerce, amending the Stevenson-Wydler Technology Innovation Act of 1980 to enhance the development and nationwide deployment of manufacturing technologies and authorizing appropriations for the Technology Administration of the Department of Commerce, including the National Institute of Standards and Technology, and for other purposes, having considered the same, reports favorably thereon with an amendment in the nature of a substitute and recommends that the bill as amended do pass.

PURPOSE OF THE BILL

The bill as reported: (1) amends the Stevenson-Wydler Technology Innovation Act of 1980 (Stevenson-Wydler Act) by adding a new title III which authorizes the National Institute of Standards and Technology (NIST) of the Department of Commerce (DOC) to assist U.S. manufacturing through a Twenty-First Century Manufacturing Infrastructure Program, which consists of both an Advanced Manufacturing Technology Development Program and a Manufacturing Extension Partnership; (2) authorizes additional manufacturing activities by the National Science Foundation

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(NSF); (3) authorizes expanded activities by NIST's Advanced Technology Program (ATP), creates a technology financing pilot project, and establishes a Commerce Technology Advisory Board; (4) requires reports on international standards activities; (5) establishes a NIST research program in wind engineering; (6) provides fiscal year (FY) 1994 and 1995 authorizations for DOC's Technology Administration, including NIST; and (7) creates a multiagency Information Technology Applications Research Program to help computer users and vendors to develop applications of computing and networking advances achieved under the existing High-Performance Computing and Communications Initiative (HPCCI).

BACKGROUND AND NEEDS

In an era of strong international economic competition, the Nation needs to develop and apply advanced technologies, including manufacturing and computing technologies, in order to prosper and support good jobs. While private industry has the primary responsibility to develop new technologies and modernize manufacturing, DOC and other Federal agencies have long supported industry-led efforts to improve the Nation's technological and manufacturing performance.

To meet these new economic challenges of the postcold war era, U.S. research and development (R&D) must place a greater emphasis on supporting civilian industrial technologies. In a major February 22, 1993, technology policy statement, entitled "Technology for America's Economic Growth, A New Direction to Build Economic Strength," the President states both the importance of technology and the reason why traditional R&D priorities are no longer adequate:

> Technology is the engine of economic growth. In the United States, technological advance has been responsible for as much of two-thirds of productivity growth since the Depression. Breakthroughs such as the transistor, computers, recombinant DNA and synthetic materials have created entire new industries and millions of high-paying jobs.
>
> International competitiveness depends less and less on traditional factors such as access to natural resources and cheap labor. Instead, the new growth industries are knowledge based. They depend on the continuous generation of new technological innovations and the rapid transformation of these innovations into commercial products the world wants to buy. * * *
>
> Since World War II, the federal government's de facto technology policy has consisted of support for basic science and mission-oriented R&D—largely defense technology. Compared to Japan and our other competitors, support for commercial technology has been minimal in the U.S. Instead, the U.S. government has relied on its investments in defense and space to trickle down to civilian industry.
>
> Although that approach to commercial technology may have made sense in an earlier era, when U.S. firms dominated world markets, it is no longer adequate. The nation

urgently needs improved strategies for government/industry cooperation in the support of industrial technology.

DOC has a leadership role to play in this new era. Since 1901, NIST and its predecessor agency, the National Bureau of Standards, have been the only Federal technology entity whose primary mission is to assist general U.S. industry. In addition, NIST's parent organization, DOC's Technology Administration, is the primary Federal policy organization for civilian technology policy. The administration has recognized DOC's role in civilian technology by requesting significant increases in its programs to assist U.S. industrial competitiveness. The selective expansion of Federal civilian technology and manufacturing programs can contribute significantly to U.S. economic competitiveness and prosperity, if coupled with additional efforts by other Federal agencies to help to transfer their expertise in high-performance computing and other areas to industry, and with Federal policies which promote a healthy business climate and fair trade.

Expanded efforts at DOC and related agencies can be important steps toward developing a comprehensive industry-led national system to identify, develop and acquire, deploy, and help to finance needed industrial technologies in a timely fashion. Government has an indispensable role as a partner with industry in performing these critical activities. America's competitors are succeeding with the type of market-driven technology strategy that requires industry leadership and government facilitation and support. Following its own traditions, the United States needs to develop an equally effective national technology strategy.

That national strategy should focus first on those areas of technology which pose either special problems or special opportunities. Today both warning signs and long-term opportunities exist in three key areas of technology—the development and deployment of manufacturing technologies, advanced technology in general, and high-performance computing and networking. In all three areas, existing Federal civilian technologies programs to support industry, particularly DOC programs, can be strengthened.

IMPORTANCE AND CURRENT CONDITION OF U.S. MANUFACTURING

Economic importance of manufacturing.—In the United States, manufacturing accounts for 19 percent of the gross domestic products, 75 percent of all U.S. exports, and approximately 19 million jobs. The manufacturing sector also supports 92 percent of all industrial R&D in the Nation.

Yet, while U.S. productivity in manufacturing remains high, over the past two decades, the rate of productivity growth has fallen behind other countries and evidence suggests that U.S. productivity has fallen behind its major competitors in certain key technology sectors. In addition, many U.S. industries have lost world market share and are lagging behind their foreign competitors in the introduction of advanced manufacturing equipment and techniques. Manufacturing jobs still pay more than service positions, but U.S. manufacturing wages for younger workers, when adjusted for inflation, actually fell between 1973 and 1989.

In 1989, a study group at the Massachusetts Institute of Technology (MIT) reached two major conclusions about American manufacturing, and published these findings in a book entitled "Made in America: Regaining the Productive Edge." First, the study concluded that manufacturing remains very important to the economy. It is unrealistic to expect that the United States can rely solely on services: exports of American services could never pay the cost of importing all manufactured goods; a loss of manufacturing industries would lead to the loss of related service sectors, such as engineering and insurance; and manufacturing is essential for national security. The book adds:

> The important question is not whether the United States will have a manufacturing industry but whether it will compete as a low-wage manufacturer or as a high-productivity producer. * * * [T]he best way for Americans to share in rising world prosperity is to retain on American soil those industries that have high and rapidly rising productivity. Manufacturing, and high-technology manufacturing in particular, belongs in this category.

Second, the MIT group found that six factors explain why U.S. manufacturing productivity and performance are not rising more quickly: outdated company strategies; short-term horizons; technological weaknesses in development and production; neglect of human resources; failures of cooperation; and government and industry at cross-purposes.

Needs and opportunities in manufacturing technology.—The effective development and use of advanced manufacturing technology is increasingly important to U.S. industry. The best new inventions and products are of little value if companies cannot produce them quickly, cost-effectively, and with high quality. In world trade, products are now introduced much more quickly than in the past, and many countries now possess the technical capabilities and skilled workforces needed to make advanced products. Increasingly, market shares, jobs, and profits will go to those companies and countries which excel in advanced manufacturing.

In addition, world manufacturing is currently undergoing two revolutions. One is a technological revolution, as computer-controlled production equipment becomes highly sophisticated and flexible. The other is an organizational revolution involving new quality management programs—the "lean production" system, pioneered by the Japanese automobile industry, and "agile production" systems, which rely on employee initiative and respond quickly and flexibly to market opportunities.

In general, the United States is not moving as quickly as other nations to develop and adopt advanced manufacturing technologies and associated business practices. For example, the March 1993 edition of American Machinist magazine published a survey ranking the United States 17th among nations in per capita consumption of machine tools, well behind Asian and European competitors. The problem is particularly acute among America's 350,000 small- and medium-sized manufacturers, firms that employ 500 or fewer employees.

While the United States continues to conduct excellent basic research in manufacturing and while some U.S. companies have reached world standards in manufacturing, the United States has serious problems in two areas: the development of advanced manufacturing technologies, and the widespread deployment and effective use of these technologies and associated management practices. In both areas, foreign governments have large, active efforts to assist their companies.

The Federal role in supporting manufacturing technology.—While the primary responsibility for improving American manufacturing falls on private industry, the Federal Government from its earliest days has supported the development of new manufacturing technologies and has taken other steps to promote strong manufacturing industries. Alexander Hamilton, while serving as the Nation's first Secretary of the Treasury, wrote his famous 1791 "Report on Manufactures," which led directly to Government policies to foster American manufacturing. Then, in 1797, the Government gave Eli Whitney a contract to make muskets using his new process of assembling products from interchangable parts, a step which led to the American system of mass production. In 1901, Congress established the National Bureau of Standards—now NIST—and gave it the responsibility to assist "any scientific society, educational institution, firm, corporation, or individual within the United States engaged in manufacturing or other pursuits requiring the use of standards or standard measuring instruments."

In recent years, DOC has undertaken several steps to help with both the development and adoption of new manufacturing technologies. First, DOC's Technology Administration works to identify financial and other barriers to the widespread use of advanced manufacturing technology. Second, NIST works with the Navy and private companies to develop new flexible computer-integrated manufacturing technology, including the Navy's important Rapid Acquisition of Manufactured Parts Project (RAMP). Third, NIST continues to provide precise measurement and quality assurance techniques for the full range of U.S. manufacturing and process industries, including electronics, materials processing, and chemical production. Fourth, through its Malcolm Baldrige National Quality Award Program, DOC honors the Nation's most progressive manufacturers and actively promotes the adoption of new quality management programs. Finally, pursuant to the Omnibus Trade and Competitiveness Act of 1988 (Public Law 100–418), NIST operates both an ATP to help industry develop new basic technologies, including manufacturing technologies, and technology extension programs to help small manufacturers to adopt new manufacturing equipment and modern business practices. Currently, DOC has the capability to help industry significantly with both the development and deployment of manufacturing technologies.

Technology development.—Industry and Government officials agreed that R&D is needed in two areas to develop and demonstrate the new technologies needed to provide American firms with the operational speed, quality, and low cost necessary to stay internationally competitive. Both areas are key features of the executive branch's new interagency Advanced Manufacturing Initiative (AMI).

The first area is intelligent machines—computer-controlled robots and other machines that can make products quickly, flexibly, and with high quality. In this regard research is needed to make these new machines work reliably and in practical work settings.

Second, new computer hardware and software tools will enable companies to improve coordination and speed the design and manufacture of new products. These tools enable improved coordination and reduced costs within firms (concurrent engineering and enterprise integration) and electronic links among firms, particularly suppliers and customer firms (electronic commerce). Development of these integration technologies will require both computer research and a sustained effort to develop voluntary industry interface standards that will enable different companies to communicate with each other easily and quickly.

Once in place, intelligent machines, enterprise integration, and electronic commerce will allow American companies to form and reform alliances that can match the speed and coordination of Japan's corporate groups, the keiretsu, but do so more flexibly without having to form rigid groups.

Laboratory research in these areas will remain important and cannot be taken for granted. In particular, NSF has an important role in supporting university engineering research centers in manufacturing, as well as related training programs.

The United States appears weaker, however, in turning these laboratory ideas and inventions into practical, integrated manufacturing systems. DOC, which has much experience in developing and refining advanced manufacturing technologies, can help in two related ways. First, any new DOC Advanced Manufacturing Technology Development Program should include continued work at NIST's laboratories to develop needed "support technologies" (sometimes called "infratechnologies"), particularly precise measurement methods, advanced sensors and in-process quality assurance techniques, manufacturing process simulation techniques, and the underlying technical work needed to help industry to develop new standards. Second, industrial consortia—conducted through NIST's ATP—should be supported to demonstrate, test, and refine new prototype manufacturing technologies and systems. The Department of Defense (DOD) SEMATECH project has demonstrated successfully the value of this kind of manufacturing R&D activity. One or more industry-led test bed projects in general manufacturing would accelerate substantially the development, refinement, and demonstration of industry's best new technology ideas.

NIST research projects and related policy initiatives by the Technology Administration would be particularly valuable today, given that other countries have major government projects to help their industries to develop and apply new advanced technologies for general manufacturing. Japan, for example, has proposed a $1 billion, 10-year government-industry Intelligent Manufacturing Systems Initiative (IMS).

While the administration has proposed an AMI to strengthen Federal manufacturing technology programs, so far the United States has no comprehensive industry-led, Government-assisted project for developing advanced technology for general manufacturing. The reported bill supports the Technology Administration and

NIST as the focal points for working with the private sector to ensure that the United States has a globally competitive manufacturing base. Federal support for industry efforts to develop new generic, next-generation technologies appears appropriate, particularly given the aid that other countries give to their firms.

Technology deployment and extension.—The United States continues to lag behind other major industrialized nations in the deployment, adoption, and use of current generations of advanced manufacturing technology and associated management practices. This is particularly true of small- and medium-sized manufacturers. In a statement submitted for the Committee's March 25, 1993, hearing on S. 4 and made on behalf of the National Coalition for Advanced Manufacturing, Mr. Don H. Davis, Jr. said:

> Of the approximately 360,000 smaller American manufacturers (those who employ 500 or fewer workers) most have not advanced in adoption of modern manufacturing technology and methods from where they were a generation ago. Only 6 in 10 of them employ advanced technology, compared with 9 out of 10 plants with more than 500 employees. Yet those smaller companies constitute 98.5 percent of all our manufacturers, 63 percent of America's manufacturing workforce, and they account for half the manufacturing done in this country.
>
> Clearly, if we are to reshape America's manufacturing outlook, we must recognize that it is these smaller companies which most need the efficiency and flexibility inherent in modern advanced manufacturing. And then, having recognized the challenge, we must help meet it.

Capital costs largely account for the slow rate at which small U.S. manufacturers adopt advanced technology and associated business practices, such as "lean production" and total quality management. However, a lack of credible technology information and assistance also hinders small companies from taking the risk of buying new equipment. A Federal role in supporting State and industry-led technology assistance efforts is appropriate, first, because large companies often have little incentive to help to modernize small firms with which they may have no long-term relationship and, second, because small firms often are reluctant to rely solely on the recommendations of companies selling advanced equipment.

The Japanese have dealt with a similar situation by establishing a system of over 170 kohsetsushi centers throughout their country. These technology assistance centers focus on the needs of small firms and are jointly funded by the national and local governments at a level of $500 million per year.

Pursuant to the Omnibus Trade and Competitiveness Act of 1988, NIST operates two technology extension programs designed to help the States assist small manufacturers—seven Regional Centers for the Transfer of Manufacturing Technology (Manufacturing Technology Centers or MTCs), and a small State Technology Extension Program (STEP) to help State governments improve their technology assistance efforts. Preliminary results from the MTCs have been positive. In November 1992, NIST released data from a study of firms assisted by two MTCs which found that 94 percent of the firms surveyed had increased sales an average of 34 percent over the 2 years since first receiving help from MTCs. Net employment among the companies increased by 7 percent over the same period, and average productivity increased by 5 percent. Exports also increased sharply.

The President has called for the creation of over 100 extension centers over the next several years, including a mix of MTCs and smaller Manufacturing Outreach Centers (MOCs). DOC now proposes to combine the extension centers, STEP, and related support activities into a unified program called the Manufacturing Extension Partnership (MEP). DOC also is working closely with DOD to ensure that new extension activities supported under FY 1993 defense conversion funds are closely coordinated with and in fact are part of the MEP.

THE OVERALL U.S. POSITION IN ADVANCED TECHNOLOGY

America's lagging position in key technologies.—According a 1990 DOC report entitled "Emerging Technologies," by the year 2000, annual worldwide sales of products based on 12 key emerging technologies may total $1 trillion. Annual sales in the United States alone may total $350 billion. The companies and nations which lead in these technical areas and capture these new market will prosper greatly, while those that lag will lose a major opportunity to improve their standards of living.

Unfortunately, the DOC study found that the United States is losing, or losing badly, relative to Japan and Europe in many of these key emerging technologies. Table I is a copy of the report's key points in this regard.

TABLE 1.—U.S. REPORT CARD; TRENDS

	Versus Japan	Versus Europe
Losing badly:	Advanced Materials Biotechnology Digital Imaging Technology Superconductors	Digital Imaging Technology Flexible Computer Integrated Manufacturing
Losing:	Advanced Semiconductor Devices High-Density Data Storage High-Performance Computing Medical Devices and Diagnosics Optoelectronics Sensor Technology	Medical Devices and Diagnostics
Holding:	Artificial Intelligence Flexible Computer-Integrated Manufacturing	Advanced Materials Advanced Semiconductor Devices High-Density Data Storage Opteolectronics Sensor Technology Superconductors
Gaining:		Artificial Intelligence Biotechnology High-Performance Computing

Source: U.S. Department of Commerce, "Emerging Technologies," Spring 1990, page xiii.

In March 1991, the private-sector Council on Competitiveness released a report, entitled "Gaining New Ground: Technology Priorities for America's Future," which reached similar conclusions about trends in technology and made the following recommendation:

> The United States is already losing badly in many critical technologies. Unless the Nation acts today to promote the development of generic industrial technology, its technological position will erode further, with the disastrous consequences for American jobs, economic growth, and national security. The Federal Government should view support of generic industrial technologies as a priority mission." (pages 3–4)

The Federal research role.—Concern about the Nation's longterm technological position has led to intense discussions over how the Federal Government can best assist private industry's efforts to speed the development and commercialization of economically important new technologies. Many observers believe that improved Federal fiscal and tax policies are vital, as are effective trade, education, and training policies. Discussion also has focused on how to make the Federal Government's $73 billion annual R&D budget more useful to commercial industry.

Since World War II, the Federal Government traditionally has devoted little of its R&D budgets to direct support of general industrial technology, relying instead of historic U.S. leadership in world markets and "spin-off" technology from research activities at DOD and other agencies performing Government missions such as space, energy, and health. The private-sector Council on Competitiveness report points out: "The United States is unique among leading industrial countries in that it has not singled out industrial competitiveness as one of its national R&D priorities." (page 13) Table II reflects government research spending priorities in the United States, Japan, and Germany; while the data are from 1988, relative national priorities have not shifted appreciably since then.

TABLE II.—PERCENTAGE DISTRIBUTION OF GOVERNMENT BUDGET APPROPRIATIONS FOR R&D BY SOCIOECONOMIC OBJECTIVE: 1988

Objective	France	West Germany	Japan	United Kingdom	Italy	Sweden	United States
Agriculture, forestry, and fishing	4.1	2.1	3.9	4.4	2.5	2.3	2.0
Industrial development	12.3	14.5	4.8	8.0	20.2	4.6	0.2
Energy	4.0	7.8	22.3	3.9	9.0	4.5	3.9
Infrastructure	1.0	1.8	1.8	1.4	0.8	8.8	1.8
Transport and telecommunications	(1)	1.0	1.4	0.3	(1)	7.9	1.6
Urban and rural planning	(1)	0.8	0.4	1.1	(1)	1.0	0.1
Environmental protection	0.7	3.4	0.5	1.2	1.7	2.5	0.5
Health	3.2	3.6	2.6	4.6	5.8	1.1	12.8
Social development and services	0.5	2.5	1.0	2.1	1.5	5.8	0.9
Earth and atmosphere	1.7	2.2	1.0	2.1	1.5	0.5	0.9
Advancement of knowledge[2]	26.9	44.0	51.3	20.5	37.2	44.6	3.8
Advancement of research	15.2	13.3	7.6	4.6	5.8	32.8	3.8
General university funds	11.7	30.8	43.7	15.8	31.4	11.9	(3)
Civil space	7.0	5.4	6.1	3.1	9.1	1.0	7.4

TABLE II.—PERCENTAGE DISTRIBUTION OF GOVERNMENT BUDGET APPROPRIATIONS FOR R&D BY SOCIOECONOMIC OBJECTIVE: 1988—Continued

Objective	France	West Germany	Japan	United Kingdom	Italy	Sweden	United States
Defense	37.6	12.5	4.8	48.5	10.2	24.1	65.6
Not elsewhere classified	1.0	0.1	....	0.3	0.5	....	....
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[1] Not separately available but included in subtotal.

[2] The advancement of knowledge category should not be equated with basic research.

[3] There is no U.S. equivalent of general university funds.

Notes.—Because of rouncing, figures may not add to 100 percent. U.S. data are based on budget authority. The distribution of government budgets among socioeconomic objectives may not completely reflect the actual distribution of government-funded research in particular fields. For example, Japanese data are based on S&T budget data, which include some items other than R&D. Because such items are a small proportion of the budget, the data may still be used as an approximate indicator of relative government R&D emphasis by objective.

Source: National Science Foundation, "International Science and Technology Data Uupdate: 1991," page 11.

However, U.S. industry now faces strong competition from foreign companies, many backed by industry-oriented research sponsored by their governments. The private-sector Council on Competitiveness report takes this position:

> Current Federal R&D spending has limited relevance to the technology needs of the U.S. private sector. Although defense-related R&D has helped U.S. industries in the past, these benefits are likely to decline in the future because the Defense Department is a technology leader in a diminishing number of industries. Moreover, programs that are directed at industrial needs are extremely small. Other nations already spend more on nondefense R&D as a percent of the GDP than the United States and are steadily increasing these levels. The United States should increase support for R&D and focus more resources on nondefense R&D that is commercially relevant. (page 45)

Two primary reasons justify a government role in supporting industry efforts to develop new civilian technologies—basic technologies that companies can then proceed to use in commercial products. First, both small and large firms often have difficulty persuading their boards of directors to invest in long-term technological research whose risks are high and benefits uncertain—even if those benefits eventually may be significant for the Nation as a whole. Furthermore, as similar industry underinvestment in basic science and engineering led the Federal Government to create NSF to support university research, a Government role also exists in supporting industry-led efforts to develop new basic technologies that are important to the Nation's strength. The Government role in this case is to help industry with the research needed to overcome the technical problems that slow company efforts to turn promising inventions into successful commercial goods and processes. The previous administration gave the rationale for this Government role in a major September 26, 1990, report entitled "U.S. Technology Policy." The report states that it is a Federal R&D responsibility to participate with the private sector in:

> precompetitive research on generic, enabling technologies that have the potential to contribute to a broad range of government and commercial applications. In many cases these technologies have evolved from government-funded

> basic research, but technical uncertainties are not sufficiently reduced to permit assessment of full commercial potential. In precompetitive research, which occurs prior to the development of application-specific commercial prototypes, research results can be shared among potential competitors without reducing the financial incentives for individual firms to develop and market commercial products and processes based upon the results. (page 5)

Second, even if market imperfections with new technologies did not exist in the United States, strong research support by other governments for their companies would continue to exist. Asian and European governments invest heavily in new technologies, sometimes with failures but often with successes. Notable successes include Japan's creation of its semiconductor and flat-panel display industries and Europe's support for Airbus (which has included R&D assistance as well as production subsidies). In the United States, Federal support for industry-led technology projects such as SEMATECH has helped to give American firms a chance to compete in world markets.

Advanced Technology Program.—Both the 1991 private-sector Council on Competitiveness report and the President's FY 1994 budget recommend increased funding for NIST's ATP—the one Federal program whose sole purpose is to help general civilian companies with the precompetitive research necessary to speed the development of promising new technologies. Its mission is important in an era when Americans create many new inventions, only to see other nations move more quickly to overcome technical problems and turn those inventions into profitable commercial products. Created in the Omnibus Trade and Competitiveness Act of 1988 (Pub. L. 100–418), the ATP is a competitive grant program in which industry proposes projects, provides at least half the funding, and conducts the research. The program is open to all areas of advanced technology. To date, 60 projects have been funded (including 18 joint ventures, or multicompany consortia). These projects commit, for their lifetimes, over $180 million in Federal funds and over $200 million private-sector funds. An additional 20 or more projects will be selected for awards before the end of FY 1993. FY 1993 funding for the program is $68 million.

A preliminary independent survey of the ATP, conducted for NIST by Solomon Associates, showed that the program is making its desired contribution to industry. ATP winners responding to the survey spoke highly of the program and cited three major strengths of the program: (1) the ability to afford and engage in this kind of high-risk, long-term research; (2) the benefits that flow from multicompany collaboration; and (3) the enhanced credibility and technology validation that can result from a company receiving an ATP award (a so-called halo effect).

For FY 1994, the President has requested $200 million for the ATP. The $200 million level would allow NIST not only to continue existing ATP projects but also to increase awards in key areas of technology, such as manufacturing. The President's budget provides for increased funding over the next several years to a FY 1997 level of approximately $750 million.

Financing innovation.—Along with concerns about the lagging U.S. position in the development of new technologies, concern also has grown in recent years over the ability of American firms to finance the development and manufacture of products based on these new technologies. This concern is based on two factors—the growing difficulties that many technology firms have in obtaining long-term "patient" capital from domestic sources, and a strong belief that even the best technologies in the world are not helpful if American firms cannot convert those technologies into profitable products or if, even worse, American firms are forced by a shortage of capital to sell their technology to foreign investors who will then reap the benefits. While concern continues over the reluctance of U.S. banks to loan to technology firms, the more important issue appears to be dramatic changes in the available amounts and types of venture capital—a traditional source of funding for U.S. technology enterprises, particularly small firms.

Part of the problem is a drop in the amounts of U.S. venture capital: while the 1992 level of $2.63 billion is higher than 1991's low of $1.36 billion, levels are still well below the total in 1987 of over $4 billion. Much less money is available today for new technology firms and projects. The character of venture capital also seems to have changed, with less emphasis on the early-stage financing which created entire industries and more emphasis on safer later-stage investments. The percentage of seed-stage investments compared to later-stage investments has declined from 53 percent in 1982 to 22 percent in 1991. From another point of view, seed investments in startup firms totalled $209 million in 1992—three times the 1991 level of $76 million but still less than 10 percent of 1992's total amount of venture capital.

Congress continues to debate tax changes which could affect the amount and types of venture capital available to fund both startup companies and technology projects in other companies. However, while long-term tax policy debates continue, a need exists to explore other mechanisms by which to increase the amount of early-stage, patient venture capital available to American firms.

This problem has attracted the attention of the bipartisan Competitiveness Policy Council (CPC). In a March 1993 report entitled "Technology Policy for a Competitive America," the CPC's Critical Technologies Subcouncil made these points:

> As has been documented in many previous studies, commercialization is a key weak link in the US technology enterprise. The US is a source of many inventions, but other nations often lead in applying new technologies to commercial advantage. * * * Entrepreneurs and small companies with exciting new technologies often have trouble obtaining the financing needed to commercialize products and grow their business, and frequently end up licensing their technology to more patient and deep-pocketed foreign companies. * * *
>
> One approach is to give selected technology agencies the authority to participate in the commercialization of some of their R&D projects. * * * There are a number of advantages to this approach. First, the work would already be within the federal agency's mission, justifying continued

> federal support. In addition, the agencies are knowledgeable about the technological opportunities and the progress made in their R&D efforts, putting them in a good position to select the most promising technologies for commercialization. * * * Recommendations: Authorize DARPA, ATP, and NIH to purchase equity or extend loans/loan guarantees to help the commercialization of promising technologies developed through their R&D contracts. (pages 112, 115–116)

One major option is to assist venture capital firms to increase the total funds they can loan to U.S. technology companies. An existing program provides a useful model that could be adapted for this purpose. Since 1958, the Small Business Administration's (SBA) Small Business Investment Companies (SBIC) program has provided Government funds to venture capitalists who, in turn, use Government and private funds to invest in American companies. The program adopts a market-driven approach, in which all decisions concerning the specific companies in which to invest are made by private experts—the venture capitalists—rather than Government officials.

An SBIC-type program however, needs three key features in order to meet the true needs of U.S. technology firms: (1) it must focus on technology, especially early-stage financing for new technology projects; (2) it must focus on small firms but also have the flexibility to help medium-sized firms with promising new technologies and to help multicompany joint ventures in which small firms have the lead but large companies may contribute useful technology; and (3) it must be designed to be attractive to venture capitalists interested in early-stage financing.

While the SBIC program has occasionally helped small high-technology startup firms, it was not intended to meet these three criteria. First, the SBIC program does not and is not intended to focus on technology firms, given SBA's mission to support the full range of small business. Only approximately 16 percent of SBIC investments are in technology firms, using even a broad definition of technology. This means that only about $9.6 million of the SBIC program's FY 1992 budget of $60 million went to technology efforts, and only about $26 million of the FY 1993 SBIC appropriation of $163 million. Investments in technologies identified by the Government as "critical" would be even less.

Second, SBICs can invest only in the smallest of firms—currently companies whose total value is $6 million or less. This investment is appropriate for an agency that focuses on small business, and yet many of the Nation's new high-technology jobs are being created in small- and medium-sized firms whose total valuations exceed the low level of $6 million. Moreover, many of the most promising new technology projects in America today involve small companies that receive donations of technology or intellectual property from larger firms. Large firms often have technologies which are not relevant to their core businesses, but which they will contribute to promising small firms. SBICs, however, are not allowed to even consider investing in such joint ventures.

Third, SBICs are required to share profits with SBA, which may appear appropriate at first glance but which in fact makes the program unattractive to many venture capitalists and deters them from joining the SBIC program.

Given SBA's focus on small firms and on the full range of small firms, it would be inappropriate to expect SBA and the SBIC program to meet the specific and special needs of the Nation's technology firms. It is the Committee's intent, therefore, to create a program which will be dedicated to critical technology investments, using the SBIC program as a model. The Committee believes that the appropriate management authority for such a program is the Government's lead civilian technology agency, DOC, because DOC can best advise the technology-oriented venture capital entities on technology risks and opportunities.

In recognition that an important way to help the Nation to overcome its current shortage of patient, early-stage venture capital for promising technology projects, the legislation creates a Civilian Technology Investment Company Program led by DOC.

Technology information and technology advice.—Federal policymakers also need two particular types of information—information on foreign technology policies, and timely and effective advice from U.S. industry.

Since the United States no longer enjoys automatic world leadership in advanced technologies, knowledge of developments in other countries is increasingly becoming necessary in order to formulate sound U.S. technology policies. Information is needed not only on how American researchers and companies compare technologically with foreign competitors, but also on whether and how other governments are using their technologies to seek competitive advantage or dominance over key U.S. industries. A great deal of information on foreign technologies and foreign technology policies and related industrial strategies is already available in the Federal Government, both at DOC and at other agencies. The need now is coordination of reports and other information sources that are readily available to policymakers. An information coordination office within DOC would serve such a function.

Similarly, more information is now needed on the technology needs and programs of U.S. industry. As the Federal Government shifts its R&D programs more toward economic priorities, and as support for industry-led R&D grows, advice and information from industry become correspondingly more important. Within DOC, a technology advisory board would be very useful, particularly if it is well-coordinated with other industrial advisory mechanisms within DOC and other parts of the Government.

APPLICATIONS OF HIGH-PERFORMANCE COMPUTING AND NETWORKING

One of the most important and promising of today's new technologies is high-performance computing—the set of technologies that bring powerful computing and telecommunications tools to scientists, business people, and general citizens. In science and engineering, for example, advanced supercomputers and the data networks which connect researchers to these machines are revolutionizing such diverse scientific fields as meteorology, aircraft design, and medicine. Supercomputers are also vital to national security. Eventually, these technologies will come into homes and offices across the country, combining television, telephones, and computing into "information superhighways" that not only will give Americans access to additional television channels but also will promote higher industrial productivity, improved health care, electronic libraries, and a wide range of other services.

To develop the new technologies necessary to high-performance computing, and particularly to bring advanced computing to federally funded researchers and the national security community, the Federal Government in the late 1980s created an important interagency R&D program known as the HPCCI. This initiative was codified and authorized in the High-Performance Computing Act of 1991 (Public Law 102–194).

Currently funded at approximately $800 million per year, this large R&D project aims to develop the advanced computer hardware, software, and networking technology needed to create high-performance computing. The major agencies involved are NSF, the DOD's Advanced Research Projects Agency (ARPA), the National Aeronautics and Space Administration (NASA), the Department of Energy (DOE), and DOC.

While the main purpose of the current program is to create an advanced computing infrastructure to serve two Government missions—science and national security—one goal of the program always has been to help to move federally developed technology from the laboratory and Government agencies into the private sector, where it can benefit the overall economy, and to transfer it in a way that encourages the development of new private communications systems and applications. It is not the aim of the HPCC program to have the Government build or operate fiber optics communications systems or other advanced telecommunications facilities to compete with the private sector. The purpose of HPCCI instead is to develop technology and computer networks for Government purposes and then to share that technology with private firms. In particular, if properly used, that technology can aid and accelerate the development of a private-sector National Information Infrastructure (NII)—a new private telecommunications system that can increase greatly U.S. productivity, boost the international competitiveness of U.S. information companies, and provide a wide range of new services to all of the Nation's citizens.

An important question, however, is how the Federal Government can best use its technologies and resources to help private users and industry to develop NII systems. To adapt these technologies to private needs, more is needed than simply making computer and communications hardware available to private companies. Advanced computing technology will be adopted in the private sector and used for the national good when applications are developed that are useful and create a market demand for new computing services.

Therefore, to stimulate the use of advance computing in the private marketplace, and particularly to stimulate its use in addressing national priorities such as education, it is appropriate for the federal Government to support demonstration projects for the development and trial use of new applications of high-performance computing. These demonstration projects can be research partnerships among Government agencies, computer users, and computer vendors.

In a statement submitted to the Committee, the Computer Systems Policy Project, an association of the chief executives of the Nation's leading computer firms, summarized the value of such research partnerships as follows:

> We [in America] must find new and innovative ways to rekindle economic growth, remain competitive abroad, and create the high paying high-technology jobs that will enable Americans to maintain and enhance their standard of living. We must be more productive and innovative in finding ways to maximize the role and involvement of every American citizen as we move quickly and efficiently into the Information Age. The United States is currently the world leader in computing and communications technologies, and an enhanced NII will put our information technology advantage to work for all Americans.
>
> Pilot projects and testbeds are essential to demonstrate that the application of NII technologies in new areas and the benefits that they will make possible, such as the cost savings that may be achieved in the management of health care data; to accelerate the development of standards; to address the problems in scaling new technologies to meet the demands of many diverse users; and to bring together researchers from industry, government, academia, and the user communities in the development of solutions to difficult technology challenges.

In particular, four areas seem appropriate for these trial applications: education, health care, manufacturing, and libraries, and data bases. All four areas share important characteristics—they are critical to the economy; the Government has long had a legitimate interest in promoting them: and, for each of them, computing technology is now within reach to revolutionize productivity and services.

For example, new ways can be developed to use high-speed computer networks to link high schools and elementary schools so that teachers and students can communicate with their colleagues around the country, access digital libraries of information, and consult with outside experts. New technology could allow a doctor in a rural area to send instantly x-ray images to a major medical center for a second opinion. Advanced supercomputers and networks could allow a local library or school to have access to the holdings of the Library of Congress. In manufacturing, computer-aided design can replace drafting tables and the manual construction of prototypes and models, and electronic links between factories can speed the design and production of new products.

Support for projects by computer users and vendors to develop new applications of high-performance computing is best supported through the Federal agencies which work with these specific areas of education, libraries, manufacturing, and health care. In order to ensure interagency cooperation and to avoid unnecessary duplication, these agencies should work in accordance with an interagency research plan developed under the auspices of the White House Office of Science and Technology Policy (OSTP).

LEGISLATIVE HISTORY

Senator Hollings introduced S. 4 on January 21, 1993. Senators Mitchell, Rockefeller, Bingaman, Lieberman, Riegle, Robb, Wofford, Kerry, Moseley-Braun, Leahy, Levin, Pell, Bryan, Breaux, Conrad, Burns, Sarbanes, Baucus, Kerrey, and Exon are cosponsors. Title I through V of the legislation are based on S. 1330, a bill from the 102nd Congress which passed the Senate by unanimous consent on June 30, 1992. Title VI is based on S. 2937, a bill also from the 102nd Congress, introduced on July 1, 1992.

In 1993, the Committee has held two hearings on S. 4: a February 24 Full Committee hearing at which Secretary of Commerce Ronald H. Brown testified, and a March 25 hearing with a range of industry and State witnesses.

On May 25, 1993, in open executive session, the Committee considered an amendment in the nature of a substitute to S. 4. By voice vote, S. 4 as amended was ordered to be reported without objection.

SUMMARY OF MAJOR PROVISIONS

1. Title I lists the reported bill's contents and states findings, purposes, and definitions. One major purpose is to strengthen the ability of Federal technology programs, particularly those at DOC, to support industry-led efforts to improve the technological capabilities, manufacturing performance, information infrastructure, and employment opportunities of the United States. A second major purpose is to develop a nationwide network of technological advice for manufacturers, particularly small- and medium-sized firms.

2. Title II deals with manufacturing. Subtitle A amends the Stevenson-Wydler Act to create a DOC 21st Century Manufacturing Infrastructure Program, which consists of two parts: (i) a new Advanced Manufacturing Technology Development Program, largely operated through NIST's ATP, which would support industry-led efforts to develop, refine, and test advanced computer-controlled manufacturing systems; and (ii) a Manufacturing Extension Partnership, which would create a nationwide manufacturing extension system linking NIST MTCs, smaller Manufacturing Outreach Centers, and new efforts by NIST's STEP to help those States currently without manufacturing extension programs to develop such programs. Subtitle A also would create an industry-led Manufacturing Advisory Committee, and would clarify the role of DOC-supported manufacturing centers in providing information to client firms on available worker training services. Subtitle B of title II would expand NSF's manufacturing research and training programs.

3. Title III focuses on critical technologies and would (i) require DOC to submit a long-term plan for the ATP; (ii) create a new DOC Office of Technology Monitoring and Competitive Assessment to provide better information on the technological capabilities and industrial targeting practices of America's major trading partners; (iii) establish a Commerce Technology Advisory Board to provide high-level industry and labor input to DOC technology programs; and (iv) authorize an experimental technology DOC financing pilot

program to support venture capital firms known as civilian technology investment companies and thus stimulate the flow of investment capital to technology firms.

4. Title IV contains additional DOC provisions, including provisions regarding: (i) international standardization; (ii) the extension of the Malcolm Baldrige National Quality Award to educational institutions; (iii) cooperative research and development agreements between Federal laboratories and research partners; (iv) DOC's Clearinghouse on State and Local Initiatives; (v) the use of domestic U.S.-made products; (vi) a severability clause; and (vii) creation of a new NIST research program in "wind engineering" to help the construction industry build structures which can better withstand hurricanes and tornadoes.

5. Title V contains authorizations of appropriations. This title would provide FY 1994 and 1995 authorizations for DOC technology and manufacturing programs and the new NSF manufacturing programs. DOC authorizations would total $654 million for FY 1994 and $1,191 million for FY 1995. Authorizations for the NSF programs in the reported bill would total $50 million for FY 1994 and $75 million for FY 1995.

6. Title VI would establish a new Information Technology Applications Research Program, related to the current Federal HPCCI. The new program would be a coordinated, interagency activity to identify and promote the development of computing applications in education, manufacturing (including NIST's programs), health care, and libraries. Title VI would authorize these computer activities (excluding NIST manufacturing activities already authorized under title V) at levels of $136 million for FY 1994 and $244 million for FY 1995.

ESTIMATED COST

In accordance with paragraph 11(a) of rule XXVI of the Standing Rules of the Senate and section 403 of the Congressional Budget Act of 1974, the Committee provides the following cost estimate, prepared by the Congressional Budget Office:

U.S. CONGRESS,
CONGRESSIONAL BUDGET OFFICE,
Washington, DC, July 21, 1993.

Hon. ERNEST F. HOLLINGS,
Chairman, Committee on Commerce, Science, and Transportation, U.S. Senate, Washington, DC.

DEAR MR. CHAIRMAN: The Congressional Budget Office has prepared the enclosed revised cost estimate for S. 4, the National Competitiveness Act of 1993. This estimate supersedes the one we transmitted on July 2, 1993, and reflects subsequent changes in legislative language made by the committee.

Enactment of S. 4 would not affect direct spending and receipts. Therefore, pay-as-you-go procedures would not apply to the bill.

If you wish further details on this estimate, we will be pleased to provide them.

Sincerely,

ROBERT D. REISCHAUER,
Director.

CONGRESSIONAL BUDGET OFFICE—COST ESTIMATE

1. Bill number: S. 4.

2. Bill title: The National Competitiveness Act of 1993.

3. Bill status: As ordered reported by the Senate Committee on Commerce, Science, and Transportation on May 25, 1993.

4. Bill purpose: Title II of S. 4 would establish a program to foster the development of advanced manufacturing technologies. The program would include a least one facility for developing and testing manufacturing and networking technologies, as well as the existing manufacturing and development programs of the National Institute of Standards and Technology (NIST). It would establish a manufacturing extension partnership, which would include manufacturing outreach centers, an information network and clearinghouse, and several existing programs. Title II also would create a Manufacturing Advisory Committee to advise the director of the Office of Science and Technology Policy, and would provide an indefinite authorization of appropriations for the committee's operation in 1994 and 1995. The title would expand the scope of the State Technology Extension Program, and would extend the period for which manufacturing technology centers could receive federal funding. Finally, title II would require the National Science Foundation (NSF) to expand two research programs and would authorize its director to establish programs to develop a quality management curriculum and to provide fellowships and traineeships.

Title III would establish a program for the support of large-scale research and development consortia. It would establish a Technology Financing Pilot Program. Under this program, the Technology Administration (TA) could purchase or guarantee debentures or purchase nonparticipating preferred securities issued by qualified investment companies. The TA also would be allowed to pool debentures or securities issued by investment companies and to guarantee trust certificates, base on these pools, that would be issued to the public. The TA would be permitted to contract with other agencies for administrative assistance in operating the program.

Title III would establish within the TA an Office of Technology Monitoring and Competitiveness Assessment to collect and disseminate information regarding foreign research, foreign technologies, and related technology assessment activities within the federal government. That office would be authorized to create a technology fellowship program to support study of those countries that are major competitors of the United States.

Title IV would authorize the expansion of NIST's pilot program to aid other countries in developing industrial standards, expand the scope of the Malcolm Baldridge Awards, and establish within NIST a national quality laboratory and a wind engineering research program.

Title V would authorize appropriations for the Department of Commerce totaling $105 million for 1993, $655 million for 1994, $1,194 billion for 1995, and $50 million for 1996. In addition, title V would authorize appropriations for NSF of $50 million for 1994 and $75 million for 1995.

Title VI would establish a research program dealing with applications of information technology. The bill would authorize appropriations of $41 million for 1993, $136 million in 1994, and $244 million for 1995 for NIST, NSF, the National Aeronautics and Space Administration, and the National Library of Medicine. Title VI, as well as titles II, III, IV, and V, would require several reports, plans, and studies.

5. Estimated cost to the Federal Government:

[By fiscal year, in millions of dollars]

	1993	1994	1995	1996	1997	1998
Authorizations of appropriations:						
Amounts specified in the bill	146	841	1,513	50	0	0
Estimated amounts	0	2	2	0	0	0
Less: Existing authorizations	105	0	0	0	0	0
Net additional authorizations	41	843	1,515	50	0	0
Estimated outlays	0	410	918	609	343	145

The costs of this bill fall primarily within budget function 370.

Basis of estimate: CBO assumes that the amounts authorized for each year would be appropriated, including the additional amounts authorized for fiscal year 1993. Estimated outlays for existing programs are based on historical outlay rates. Estimated outlays for new programs are based on the rates for similar programs.

S. 4 would establish a Manufacturing Advisory Committee within the TA, and would authorize the appropriation of such sums as may be necessary for the committee's operations. Based on information from the TA and on the costs of other advisory committees, CBO estimates that this committee would cost about $2 million a year, primarily for personnel costs associated with research and report preparation.

Loan program: The Technology Financing Pilot Program established by the bill would permit the establishment of investment companies that would invest in small and medium-sized businesses engaged in research, investment, or exploitation of advanced technologies and products.

Investment companies established under the pilot program could issue a variety of financial instruments, including debentures and nonparticipating securities. The TA would have the authority to purchase or guarantee debentures, to purchase nonparticipating preferred securities, or to pool the debentures or securities issued by investment companies and to guarantee trust certificates based on the pool. Guarantees made by the TA of investment company debentures and trust certificates would be considered loan guarantees for the purposes of the Credit Reform Act of 1990. Direct purchases by the TA of debentures or nonparticipating preferred securities issued by investment companies would be considered direct loans. CBO expects that the TA would contract with the Small Business Administration (SBA), or with another agency with experience in loan administration, to administer the program.

The Credit Reform Act of 1990 requires that appropriations be provided for loan subsidy costs (essentially, the amount of money the federal government will lose on the loan, on a net present-value basis) and administrative costs. CBO expects that administrative costs would be approximately ten percent of the total cost of the loan program. The bill would require that the subsidy rate for the loan program not exceed 15 percent. Therefore, CBO estimates that the $50 million authorized for this program in 1995 would permit the government to make or guarantee about $300 million in loans.

6. Pay-as-you-go considerations: The Budget Enforcement Act of 1990 sets up pay-as-you-go procedures for legislation affecting direct spending or receipts through 1995. CBO estimates that enactment of S. 4 would not affect direct spending or receipts. Therefore, pay-as-you-go procedures would not apply to the bill.

7. Estimated cost to State and local governments: None.

8. Estimate comparison: None.

9. Previous CBO estimate: On July 2, 1993, CBO prepare a cost estimate for S. 4, the National Competitiveness Act of 1993, as ordered reported by the Senate Committee on Commerce, Science, and Transportation. There is no difference in the estimated cost of the bill between the original estimate and this revised version. The only change involves the amount of loans that could be made or guaranteed if the authorized loan subsidies are appropriated.

After July 2, the committee modified S. 4 to permit the TA to contract with another agency to administer the loan program in title III We expect that the TA would contract with the SBA to administer the loan program. Utilizing the SBA's expertise and existing administrative infrastructure would decrease the expected cost of administering the loan program to about ten percent. The committee removed language that would have permitted the TA to enter into profit-sharing agreements with companies selling securities to the TA, and added language that would allow the TA to pool securities issued by investment companies and to sell trust certificates based on these pools. It also required that the subsidy rate for the loan program not exceed 15 percent. The changes would permit the TA to guarantee a total loan level of approximately $300 million, compared to $95 million in the previous estimate.

10. Estimate prepared by: John Webb, Patricia Conroy, Mark Grabowicz, and Connie Takata.

11. Estimate approved by: Paul Van de Water, for C.G. Nuckols, Assistant Director for Budget Analysis.

REGULATORY IMPACT STATEMENT

In accordance with paragraph 11(b) of rule XXVI of the Standing Rules of the Senate, the Committee provides the following evaluation of the regulatory impact of the legislation, as reported.

S. 4, as reported, would provide additional authorities to DOC regarding technology development and manufacturing research and deployment, to NSF for manufacturing programs, and to a number of Federal agencies involved in the development of applications of high-performance computing. It also would provide authorization of appropriations to NIST for its programs for FY 1994 and 1995 and certain authorizations for NSF and Federal computer programs.

The reported bill would confer no new regulatory authority on NIST, the Technology Administration, or any other unit of the Federal Government. Implementation of the legislation would not increase Federal regulation of any individuals or businesses, and thus in this respect would not result in increased Federal regulation, economic effect, impact on personal privacy, or additional paperwork. Under the programs authorized by the reported bill, the Federal Government would make decisions regarding applications for financial assistance and would require applicants to submit certain information. However, all such business relationships would be voluntary. In terms of paperwork, the reported bill would require several reports on various issues dealt with in the legislation.

SECTION-BY-SECTION ANALYSIS

SECTION 1.—SHORT TITLE; TABLE OF CONTENTS

Subsection (a) provides that this Act may be cited as the "National Competitiveness Act of 1993".

Subsection (b) lists the reported bill's table of contents.

TITLE I.—GENERAL PROVISIONS

SEC. 101.—FINDINGS

This section states findings. Congress finds and declares the following:

(1) In an increasingly competitive world economy, the companies and nations which lead in the rapid development, commercialization, and application of new technologies, and in the low-priced, high-quality manufacture of products based on those technologies, will lead in economic growth, employment, and high living standards.

(2) While the United States remains the world leader in science and invention, it has not done as well as it should in commercializing and manufacturing new inventions. This lag and the unprecedented competitive challenge that the Nation has faced from abroad have contributed to a drop in real wages, living standards, and employment opportunities.

(3) While the private sector must take the lead in the development, application, and manufacture of new technologies, the Federal Government should—

(A) assist industry in the development of high-risk, long-term precommercial technologies which promise large economic benefits for the Nation;

(B) support industry-led efforts to develop and refine advanced manufacturing technologies, including technologies which improve productivity and quality and which build upon and enhance employee skills;

(C) work with States, the private sector, worker organizations, and technical and professional societies to help small- and medium-sized manufacturers throughout the Nation to adopt best current manufacturing technologies and practices, to improve worker skills, to establish high-performance work organizations, and to prepare, as appropriate, to adopt the advanced computer-controlled manufacturing technologies of the 21st century; and

(D) cooperate with industry and academia to help create an advanced information infrastructure for the United States.

(4) In working with industry to promote the technological leadership and economic growth of the United States, the Fed-

eral Government also has a responsibility to consult with business and labor leaders on industry's long-term technological and skill needs, to monitor technological trends, production process trends, and technology targeting efforts in other nations, and generally to ensure that Federal technology and industrial modernization programs help United States industry to remain competitive and create good domestic jobs.

(5) DOC, and particularly its Technology Administration and NIST, should continue to help commercial industry to speed the development and commercialization of new technologies, improve and modernize manufacturing, adopt new methods of production, and ensure a growing and healthy national industrial base and good manufacturing jobs. To promote the long-term economic growth of the Nation, these DOC programs should be strengthened and expanded.

SEC. 102.—PURPOSES

This section states that the purposes of this Act are to—

(1) strengthen and expand the ability of Federal technology programs, particularly those of DOC, to support industry-led and State-supported efforts to improve the technological capabilities, manufacturing performance, information infrastructure, and employment opportunities of the United States;

(2) promote and facilitate, particularly through the ATP of DOC, the creation, development, and adoption of technologies that will contribute significantly to United States economic competitiveness, employment, high quality jobs, and prosperity;

(3) develop a nationwide network of sources of technological and industrial modernization advice for manufacturers, particularly small- and medium-sized firms, and to provide high quality, current information to that network;

(4) encourage the development and rapid application of advanced manufacturing technologies and processes and of advanced workplace practices;

(5) encourage cooperation among Federal departments and agencies to help firms, managers, and workers, in a coordinated fashion, to take full advantage of manufacturing technology, improve productivity and quality, and adopt high-performance work organizations which successfully integrate technology and employees;

(6) stimulate the flow of capital to business concerns engaged principally in development or utilization of critical civilian and other advanced technologies;

(7) ensure the widest possible application of high-performance computing and high-speed networking and to aid U.S. industry to develop an advanced national information infrastructure; and

(8) enhance and expand the core programs of NIST.

SEC. 103.—DEFINITIONS

This section presents definitions of the following terms: "advanced manufacturing technologies"; "advanced workplace practices"; "Director" (the Director of NIST); "Institute" (NIST); "Secretary" (the Secretary of Commerce); "source reduction"; and "Under Secretary" (the Under Secretary of Commerce for Technology).

TITLE II.—MANUFACTURING

SEC. 201.—SHORT TITLE

This section states that this title may be cited as the "Manufacturing Technology and Extension Act of 1993".

SUBTITLE A.—MANUFACTURING TECHNOLOGY AND EXTENSION

SEC. 211.—FINDINGS AND PURPOSE

Subsection (a) states findings for the subtitle. Congress finds and declares the following:

(1) U.S. manufacturers, especially small businesses, require the adoption and implementation of both modern (that is, appropriate and currently available) technology and advanced manufacturing and process technologies to meet the challenge of foreign competition.

(2) The development and deployment of modern and advanced manufacturing technologies are vital to the economic growth, environmental sustainability, standard of living, competitiveness in world markets, and national security of the United States.

(3) New developments in flexible, computer-integrated manufacturing, electronic manufacturing communications networks, and other new technologies make possible dramatic improvements across all industrial sectors in productivity, quality, and the speed with which manufacturers can respond to changing market opportunities.

(4) DOC's Technology Administration, in cooperation with other Federal departments and agencies, can continue to play an important role in assisting United States industry to develop, test, and deploy modern and advanced manufacturing technologies and advanced workplace practices.

Subsection (b) states that it is the purpose of this subtitle to help ensure the continued leadership of the United States in manufacturing by enhancing DOC's technology programs to—

(1) provide domestic manufacturers, especially small- and medium-sized companies and their workforces, with ready access to high quality advice and assistance in the development, deployment, and improvement of modern manufacturing technology, and in solving their specific technology-based problems; and

(2) encourage, facilitate, and promote the development and adoption of advanced manufacturing technologies and advanced workplace practices by the private sector.

SEC. 212.—MANUFACTURING TECHNOLOGY AND EXTENSION AMENDMENTS TO THE STEVENSON-WYDLER ACT

This section amends the Stevenson-Wydler Act (15 U.S.C. 3701 et seq.) by adding at the end a new title III, entitled "Manufacturing Technology." The new title has five sections.

New section 301 of the Stevenson-Wydler Act presents a statement of policy. Congress declares that it is the policy of the United States that—

(1) Federal agencies, particularly DOC, shall work with industry and labor to ensure that within 10 years of the date of enactment of this title the United States is second to no other nation in the development, deployment, and use of advanced manufacturing technologies;

(2) all the major Federal research and development agencies shall place a high priority on the development and deployment of skill-based and advanced manufacturing technologies, and shall work closely with U.S. industry and with the Nation's universities to develop and test those technologies;

(3) since the development of new skills in the existing and entry workforce, and the development of new organizational and managerial approaches, are integral parts of successfully deploying advanced manufacturing and related technologies, advanced workplace practices should be developed and deployed simultaneously and in a coordinated fashion with the development and deployment of advanced manufacturing technologies; and

(4) other Federal departments and agencies which work with civilian industry and labor may, as appropriate and consistent with applicable statutes and duties, work with DOC.

New section 302 of the Stevenson-Wydler Act states DOC's role in manufacturing. Subsection (a) says that DOC shall, consistent with the policy declared in new section 301, work with United States industry and labor and, as appropriate, other Federal departments and agencies to—

(1) help develop new generic advanced manufacturing technologies, including advanced flexible computer-integrated manufacturing systems and electronic communications networks;

(2) assist the States and the private sector to help U.S. manufacturers, especially small- and medium-sized manufacturing enterprises, to adopt best current manufacturing technologies and workplace practices and, as appropriate, new advanced manufacturing equipment and techniques; and

(3) work with the private sector, other Federal departments and agencies, State and local governments, and educational institutions as a catalyst to help develop new manufacturing business practices and arrangements, accounting standards, improved supplier-customer relations, manufacturing modernization and investment justification strategies, and other steps which would accelerate the development, deployment, and use of advanced manufacturing technologies by U.S. industry, as well as evaluate foreign programs to modernize manufacturing.

New section 302(a)(3) is intended to highlight the importance of the role played by DOC's Office of the Under Secretary for Technology and Office of Technology Policy (OTP) in promoting manufacturing modernization. These units of DOC's Technology Administration have long analyzed the general business and economic conditions which affect manufacturing and have served as a catalyst to make Federal policy more supportive of the manufacturing sector. OTP and NIST should consider working together and with other appropriate organizations to develop information "packages" or modules that would help typical small manufacturers to improve their manufacturing equipment and practices. Such packages would be oriented to the business needs of manufacturers and might include information on the business justification for new equipment, updated accounting systems, software and hardware recommendations, and business practices which will promote improved manufacturing and productivity.

New section 302(b) establishes within NIST a 21st Century Manufacturing Infrastructure Program, which shall include—

(A) the Advanced Manufacturing Technology Development Program established under new section 303; and

(B) the Manufacturing Extension Partnership established under new section 304 and the associated programs established under sections 25 and 26 of the NIST Act (15 U.S.C. 278k and 278l).

The Secretary, through the Under Secretary and the Director, may accept the transfer of funds from any other Federal agency and may use those funds to implement the 21st Century Manufacturing Infrastructure Program and to support its activities.

This provision is intended to crease a national program of technology development and deployment that will meet the business needs of American industry. In designing and operating such a program, it is vital that DOC understand and respond to industry's needs and recommendations. Therefore, the Secretary is directed to obtain ongoing, broad-based U.S. industry input on the establishment and operation of the 21st Century Manufacturing Infrastructure Program. The Secretary is also directed to consult with industry experts, including those involved in the Malcolm Baldrige National Quality Awards Program, to develop mechanism to evaluate the design and effectiveness of the Program.

New section 303 of the Stevenson-Wydler Act establishes a NIST Advanced Manufacturing Technology Development Program. New subsection (a) states that the Secretary, through the Under Secretary and the Director, shall establish an Advanced Manufacturing Technology Development Program which shall include advanced manufacturing systems and networking projects.

New section 303(b) states that the goal of the Advanced Manufacturing Technology Development Program is to create collaborative multiyear technology development programs involving U.S. industry and, as appropriate, other Federal agencies, the States, worker organizations, universities, and other interested persons, in order to develop, refine, test, and transfer design and manufacturing technologies and associated applications, including advanced computer integration, skill-based manufacturing systems, networking, and electronic data exchange.

This subsection is intended to support technology work which will benefit the full range of U.S. manufacturing industries. While much of the emphasis of the Advanced Manufacturing Technology Development Program inevitably will focus on the precision manufacturer of machined parts, the program is intended also to support research in other areas of manufacturing such as electronic components and assemblies, nondurable goods, and plastic parts.

Also, the subsection's emphasis on skill-based manufacturing systems is intended to be a major feature of the program. NIST, in close consultation with both industry and worker organizations, should ensure from the beginning of the program that the research carried out and the technology developed utilized the skills of American workers, thus reducing any unnecessary mismatch between equipment and skills and any associated reduction in productivity gains, and also leads to new equipment which supports high-skilled rather than low-skilled jobs. Any Government research project of this type has a responsibility to promote the creation of good jobs, as well as to ensure that new equipment is safe, ergonomic, and designed to be comprehensible and usable by workers on the shop floor. This is particularly important to U.S. competitiveness today, when companies are reducing management layers, giving line employees more responsibility, and becoming more dependent than before on the skills, flexibility, and agility of workers. NIST is encouraged to conduct a study of how both Americans and researchers in other countries have tried to design new manufacturing equipment to match the skills and needs of actual workers.

New section 303(c) states that the Advanced Manufacturing Technology Development Program shall include the following components:

(1) the advanced manufacturing research and development activities of NIST; and

(2) one or more technology development testbeds within the United States, selected in accordance with procedures, including costsharing, established for the ATP under section 28 of the NIST Act (15 U.S.C. 278n), whose purpose shall be to develop, refine, test, and transfer advanced manufacturing and networking technologies and associated applications through a direct manufacturing process.

New section 303(d) states that the Advanced Manufacturing Technology Development Program, under the coordination of the Secretary, through the Director and, as appropriate, in consultation with other Federal officials, shall—

(1) test and, as appropriate, develop the equipment, computer software, and systems integration necessary for the successful operation within the United States of advanced design and manufacturing systems and associated electronic networks, with an emphasis on technologies which both promote U.S. economic competitiveness and build on and expand the skills of U.S. workers;

(2) establish at NIST and the technology development testbed or testbeds—

(A) prototype advanced computer-integrated manufacturing systems; and

(B) prototype electronic networks linking manufacturing systems, including networks linking customer firms and supplier firms;

(3) assist industry to develop and implement voluntary consensus standards relevant to advanced computer-integrated manufacturing operations, including standards for networks,

electronic data interchange, and digital product data specifications;

(4) help to make high-performance computing and networking technologies an integral part of design and production processes where appropriate;

(5) conduct research to identify and overcome technical barriers to the successful and cost-effective operation of advanced manufacturing systems and networks;

(6) facilitate industry efforts to develop and test new applications for manufacturing systems and networks, including both highly flexible and low-pollution manufacturing technologies;

(7) conduct research in advanced workplace practices related to and necessary for the successful deployment of advanced manufacturing technologies;

(8) involve in the Advanced Manufacturing Technology Development Program, to the maximum extent practicable, both those U.S. companies which make manufacturing and computer equipment and a broad range of personnel from those companies which buy the equipment;

(9) identify training needs, as appropriate, for company managers, engineers, and employees in the operation and applications of advanced manufacturing technologies and networks, with a particular emphasis on training for production workers in the effective use of new technologies;

(10) work with private industry, worker organizations, the Department of Labor, technical and professional societies, universities, and other interested parties to develop standards for the use of advanced computer-based training systems, including multimedia and interactive learning technologies that assure that production workers effectively learn, adapt, and utilize advanced manufacturing technologies and workplace practices;

(11) involve small- and medium-sized manufacturers in its activities;

(12) exchange information and personnel, as appropriate, between the technology development testbeds and the electronic networks created under new section 303; and

(13) incorporate and experiment with source reduction techniques and technologies at the test bed or test beds, consulting, as appropriate, with other Federal officials.

This provision would require, among other steps, that the testbeds incorporate appropriate pollution prevention techniques. For example, they might incorporate electronic waste detection technologies into factory automation systems, or evaluate how advanced design and manufacturing systems might improve waste prevention.

New section 303(e) states that in selecting applicants to receive awards under new subsection (c)(2), the Secretary shall give particular consideration to applications that have existing computer expertise in the management of business, product, and process information such as digital data product and process technologies and customer-supplier information systems, and to the ability to diffuse such expertise into industry, and that, in the case of joint research and development ventures, include both suppliers and users of advanced manufacturing and computer equipment or systems. It also states that an industry-led joint research and development venture applying for an award under new subsection (c)(2) may include one or more State research organizations, universities, independent research organizations, or Regional Centers for the Transfer of Manufacturing Technology, as created under section 25 of the NIST Act (15 U.S.C. 278k).

It is intended that NIST carry out new section 303(e) in a manner which, to the extent appropriate and consistent with program quality, provides balanced geographical distribution and a balanced distribution between urban and rural recipients. The program should be operated so that it helps industry throughout the United States.

New section 303(f) states that, within 6 months after the date of enactment of this title, and before any request for proposals is issued, the Secretary shall hold one or more workshops to solicit advice from U.S. industry and worker organizations and from other Federal agencies, particularly the Departments of Defense and Labor, regarding the specific missions and activities of the testbeds.

Furthermore, the Secretary shall, to the greatest extent possible, coordinate activities under new section 303 with activities of other Federal agencies and initiatives relating to Computer-Aided Acquisition and Logistics Support, electronic data interchange, flexible computer-integrated manufacturing, and enterprise integration.

New section 303(f) is intended to ensure that DOC works closely with other agencies, particularly DOD, in designing and operating the Advanced Manufacturing Technology Development Program. NIST and DOD have long cooperated in manufacturing technology work, most notably in the Automated Manufacturing Research Facility (AMRF) and the Navy's Rapid Acquisition of Manufactured Parts (RAMP) project. DOD continues to play an active role in manufacturing technology. In keeping with its technology reinvestment and defense conversion efforts, DOD has provided significant support to researchers for the development of the tools necessary to extend advanced manufacturing capabilities, including agile manufacturing and enterprise integration capabilities, to U.S. business. NIST's own programs, to the greatest extent possible, should coordinate with these DOD efforts.

Also, the Secretary may request and accept funds, facilities, equipment, or personnel from other Federal agencies in order to carry out responsibilities under new section 303.

New section 303(g) states that nothing in new section 303 shall be construed to create any immunity to any civil or criminal action under any Federal or State antitrust law, or to alter or restrict in any manner the applicability of any Federal or State antitrust law.

New section 304 of the Stevenson-Wydler Act establishes a NIST Manufacturing Extension Partnership (MEP). New subsection (a) establishes the MEP. The Secretary, acting through the Under Secretary and the Director, shall implement and coordinate the MEP in accordance with an initial plan that shall be prepared and submitted to Congress within 6 months after the date of enactment of this title and a 5-year plan for the MEP that shall be submitted to Congress within 1 year after such date of enactment. The 5-year plan shall be updated and submitted to Congress annually. The purpose of the MEP is to link and strengthen the Nation's manufacturing extension centers and activities in order to assist U.S. manufacturers, especially small- and medium-sized firms, to expand and accelerate the use of modern manufacturing practices, and to accelerate the development and use of advanced manufacturing technology and advanced workplace practices.

New section 304(b) provides that the MEP shall be a cooperative effort of DOC, the States, industry and labor, nonprofit organizations, and, as appropriate, other Federal agencies to provide a national system of manufacturing extension centers and technical services to U.S. companies, particularly small- and medium-sized manufacturers. The MEP shall include the following components:

(1) Manufacturing Outreach Centers (MOCs), as authorized under new subsection (c);

(2) Regional Centers for the Transfer of Manufacturing Technology (also known as Manufacturing Technology Centers, or MTCs), as established under section 25 of the NIST Act (15 U.S.C. 2781), and the STEP, as established under section 26 of the NIST Act (15 U.S.C. 278*l*);

(3) an activity, coordinated and funded by the Institute, which links and supports MOCs and MTCs, and which operates the information network provided for under new subsection (d) and the clearinghouse system developed under new subsection (e); and

(4) such technology and manufacturing extension centers supported by other Federal departments and agencies, States, industry, and nonprofit organizations as the Secretary may deem appropriate for inclusion in the MEP.

It is intended that NIST operate the MEP in a manner which, to the extent appropriate and consistent with Program quality, provides balanced geographical distribution and a balanced distribution between urban and rural recipients. In particular, NIST should give careful consideration to MOC applications from rural or smaller States; these States often cannot afford a full-sized MTC but nonetheless have manufacturers that are very important to their economies. The Program should be operated so that it helps small- and medium-sized manufacturers throughout the United States. Furthermore, this section is intended to allow applications from multi-State consortia, including multi-State applications for MTCs, MOCs, and STEP awards.

Paragraph (3) of the new subsection is intended to authorize not only the computer network authorized under new section 304(d) but also a range of services which supports the expansion of the MTC Program and the creation of the MOC effort. Such services might include training for extension agents, support for groups which help the centers with specific technologies such as electronic commerce, standardized assessment tools and modernization materials that can be used by a wide range of extension centers, identification of manufacturing best practices, materials for helping centers train companies in ISO 9,000 series quality standards, and initial support for a professional society of extension professionals. The existing MTCs also are to be commended or forming an association, the Modernization Forum, which exchanges information among the centers, helps meet common needs, and provides valuable assistance to both NIST and Congress.

In all aspects of the MEP, NIST should consider applications which include innovative extension mechanisms. For example, the Committee is aware that mobile technology transfer vans and trucks are being used in several States, including Illinois, New York, and Michigan, and help to bring equipment and information to small manufacturers. These mobile laboratories currently range in size from step vans to tractor trailers and provide the capability to conduct multisite demonstrations and instruction related to new technologies. They can speed the transfer of technologies developed at universities and elsewhere and can serve as alternatives or complements to fixed-site centers. They appear to be particularly appropriate in rural settings where manufacturers may be widely dispersed.

New section 304(c) states that Government and private sector organizations, actively engaged in technology or manufacturing extension activities, may apply to the Secretary to be designated as MOCs. Eligible organizations may include Federal, State, and local government agencies, their extension programs, and their laboratories; small business development centers; and appropriate programs run by professional and technical societies, worker organizations, industrial organizations, for-profit or nonprofit organizations, community development organizations, State universities and other universities, community colleges, and technical schools and colleges, including, where appropriate, vendor-supported demonstrations of production applications.

This new section is intended to allow a wide range of organizations to apply for MOC awards. Also, NIST hopefully will make heavy use of existing technology outlets in the States, such as the excellent university-based industrial extension programs that have been established in a number of States, the land-grant universities and colleges, and nonprofit community development organizations which serve manufacturing firms in economically disadvantaged urban and rural areas. These existing organizations are already close to the problems of firms and workers and can often provide a quick, flexible response to the individual State's needs. Moreover, the designation of existing organizations such as State-supported centers can be a timely and cost-effective way to leverage federal extension funding. Careful consideration and, as appropriate, priority should be given both to existing State, local, university, and community development organization extension programs that have demonstrated track records in improving the productivity of small firms and to proposals which would coordinate existing resources and activities within a State. Finally, the term "center" is intended to be defined broadly, including, for example, decentralized entities with multiple field offices or industrial modernization programs which are operated by or sponsored by State agencies.

New Section 304(c) also provides that any MTC may apply to the Secretary to establish an MOC, managed by or in cooperation with such MTC, which extends the effective service area of such MTC. Funding for the establishment and management of such MOC may be awarded to such MTC.

The Secretary shall establish terms and conditions of participation and may provide financial assistance, on a cost-shared basis and through competitive, merit-based review processes, to nonprofit or government participants throughout the United States to enable them to—

(A) join the Partnership and disseminate its technical and information services to U.S. manufacturing firms, particularly small- and medium-sized firms; and

(B) strengthen their direct assistance to small- and medium-sized U.S. manufacturing firms to expand and accelerate the use of modern and advanced manufacturing practices.

Furthermore, if a State plan for technology extension exists in a State where an applicant for financial assistance under new section 304(c) is operating or plans to operate, the applicant shall demonstrate in this application that its proposal is compatible with such State plan.

If an MOC is in or near a State which an MTC, the Director shall, as appropriate, encourage the MOC to cooperate with the MTC in coordinating its proposals and ongoing programs to serve manufacturers in the region. MOCs may not concurrently be designated as MTCs.

Financial assistance may be awarded under this new subsection for an initial period not to exceed 3 years and may, subject to successful evaluation by NIST, be renewed for additional periods, not to exceed 3 years each. Such assistance may not at any time exceed 50 percent of the operating costs and in-kind contributions of the recipient.

The Committee has not recommended any annual funding level for an MOC. The intention is to give both applicants and NIST considerable flexibility on this matter. In general, however, it is intended that an MOC serve several hundred small manufacturers (as opposed to the several thousand served by a full-sized MTC) and have an annual operating budget ranging from $200,000 to perhaps $1 million, with half the funding coming from the applicant and half from NIST. To the degree consistent with applicable laws and regulations, NIST is encouraged to consider in-kind contributions as part of an applicant's match.

New section 304(d) states that DOC shall provide for an instantaneous, interactive information network to serve the MEP, to facilitate interaction among MOCs, MTCs, and Federal agencies, and to permit the collection and dissemination in electronic form, in a timely and accurate manner, of information described in new subsection (e). Such information network shall, whereever practicable, make use of existing computer networks, data bases, and electronic bulletin boards. Information network arrangements, including user fees and appropriate electronic access for information suppliers and users, shall be addressed in the 5-year plan prepared under new subsection (a). The Secretary shall, to the extent practicable, coordinate these information network activities with the relevant activities of other Federal agencies, particularly the advanced manufacturing and enterprise integration activities of DOD.

New section 304(d) is intended to create a computer network which will link extension centers and, eventually, also may connect to interested small manufacturers. The network is intended as a cost-effective way to share information and best practices among manufacturing specialists. It is important that NIST use existing computer network hardware and services as much as possible, both to avoid the costs of dedicated government telecommunications lines and to avoid unnecessary duplication of privately available services. Also, it is intended that NIST, as appropriate, will consult not only with other important government agencies such as DOD but also with relevant private-sector entities, including private-sector standards development groups.

Furthermore, the Secretary is directed to maximize the usefulness of the network by using it to carry out other activities authorized in this legislation. DOC should capitalize on the network by using it to disseminate a variety of useful data and information, including benchmarking activities and the work products of the Office of Technology Monitoring and Competitiveness Assessment authorized under section 306 of the reported bill.

New section 304(3) states that the Secretary shall develop a clearinghouse system, using NIST, the National Technical Information Service (NTIS), and private sector information providers and carriers, where appropriate, to—

(A) identify expertise and acquire information, appropriate to the purpose of the MEP stated in new subsection (a), from all available Federal sources, and where appropriate from other sources, providing assistance where necessary in making such information electronically available and compatible with the information network established under new subsection (d);

(B) ensure ready access by U.S. manufacturers and other interested private sector parties to the most recent relevant available such information and expertise; and

(C) to the extent practicable, inform such manufacturers of the availability of such information.

Furthermore, the clearinghouse shall include information available electronically regarding—

(A) activities of MOCs, MTCs, STEP, and the users of the information network;

(B) domestic and international standards from the NIST and private sector organizations and other export promotion information, including conformity assessment requirements and procedures;

(C) the Malcolm Baldrige National Quality Award Program, and quality principles and standards;

(D) manufacturing processes that minimize waste and negative environmental impact;

(E) advanced workplace practices that can improve quality, response time, and flexibility in manufacturing;

(F) federally funded technology development and transfer programs;

(G) responsibilities assigned to the Clearinghouse for State and Local Initiatives on Productivity, Technology, and Innovation under section 102 of the Stevenson-Wydler Act;

(H) how to access data bases and services;

(I) skills training, particularly for production workers, that is available through trade and professional organizations, federally supported programs, State resources, private industry, or other organizations; and

(J) other subjects relevant to the ability of companies to manufacture and sell competitive products throughout the world.

New section 304(f) states that in carrying out new section 304, DOC shall take into consideration the following principles:

(1) The MEP and the information network provided for under new subsection (d) shall be established and operated through cooperation and cofunding among Federal, State and local governments, other public and private contributors, and end users.

(2) The MEP and the information network shall utilize and leverage, to the extent practicable, existing organizations, data bases, electronic networks, facilities, and capabilities, and shall be designed to complement rather than supplant State and local programs.

(3) The MEP should, to the extent practicable, involve key stakeholders at all levels in the planning and governance of modernization strategies; concentrate on assisting local clusters of firms; assist rural as well as urban manufacturers; promote collaborative learning and cooperative action among manufacturers; link industrial modernization programs tightly to existing and future Federal training initiatives, including those for youth apprenticeship programs and for assisting other workers; encourage small firms to seek modernization services by working with major manufacturers to strengthen and coordinate their supplier assessment, certification, and development programs; encourage small firms, as appropriate, to select manufacturing equipment and practices which build upon and expand the skills of their employees; identify and honor best practices by firms and the programs that support them, including both technology and workplace practices; provide funding based on performance and ensure rigorous evaluation of extension services; as appropriate, coordinate Federal programs that support manufacturing modernization; work with Federal, State, local, and private organizations so that MOCs and MTCs can provide referrals to other important business services, such as assistance with financing, training, and exporting, and contribute to local business climates supportive of high-performance manufacturing.

(4) The MEP and the information network provided for under new subsection (d) shall be subject to all applicable provisions of law for the protection of trade secrets and business confidential information.

(5) Local or regional needs should determine the management structure and staffing of the MOCs. The MEP shall strive for geographical balance and for balance between urban and rural recipients, with the ultimate goal of access for all United States manufacturers.

(6) MOCs should have the capability to deliver outreach services directly to manufacturers; actively work with, rather than supplant, the private sector; help firms assess needs regarding technology, workplace practices, and training; and to

the extent practicable, maximize the exposure of manufacturers to demonstrations of modern technologies in use.

(7) MOCs shall focus, where possible, on the development and deployment of flexible manufacturing technologies and practices applicable to both defense and commercial applications and on opportunities to modernize operations in ways which improve productivity, reduce waste and pollution, and increase energy efficiency.

(8) DOC shall develop mechanisms for—

(A) soliciting the perspectives of manufacturers using the services of the MOCs and MTCs;

(B) assisting in the training of technology extension agents and in helping them disseminate information on best available manufacturing technologies, including technologies for source reduction, and workplace practices; and

(C) rigorously evaluating the effectiveness of the MOCs other components of the Partnership.

(9) Nothing in new section 304 shall be construed as limiting or interfering with any collective bargaining agreement. MTCs and MOCs shall, as practicable, respect any collective bargaining agreement which is in force at a client firm.

New section 304(g) directs that MTCs and MOCs shall make available pollution source reduction and energy efficiency assessments to their interested client companies. These assessments shall assist such interested client companies in identifying opportunities for energy conservation and source reduction, and thus reduce operating costs, through either improvement in manufacturing processes or the purchase of new equipment. The Secretary is authorized to work with other appropriate Federal officials and other parties to provide employees of MTCs and MOCs with the training needed to carry out these assessments.

In general, this provision would require MTCs and MOCs to make available information on waste prevention techniques and energy efficiency to small- and medium-sized companies that may be unaware of the cost savings that they can achieve by using production technologies which boost energy efficiency, reduce pollution, and improve productivity by reducing energy and materials costs. Such information would further the goals of the legislation by increasing the competitiveness of these firms while also protecting the environment and expanding the market for environmental technologies. Federal agencies have estimated that businesses can eliminate one-third to one-half of their waste generation by implementing techniques which reduce sources of pollution. Further, one recent study showed that 25 percent of all source reduction activities require no capital investment for implementation and, of those that require capital, 50 percent of the investments were recouped in savings, on average, in less than 18 months.

The provision also requires MTCs and MOCs to make available pollution prevention and energy assessments to client companies. It is intended that this service be offered to interested companies as part of a center's offer to provide an overall assessment of a firm's manufacturing equipment and practices. The requirement to offer this service would be met by the designation of at least one employee of each MTC or MOC to either perform assessments directly or to train others in the performance of assessments. To the extent practicable, NIST should work with the Environmental Protection Agency (EPA) and DOE both to seek training from these agencies for these designated center employees and to include EPA and ODE employees in the assessment process. As much as possible, the MTCs and MOCs should take advantage of the source reduction and energy efficiency capabilities already present at EPA and DOE. EPA, for example, has conducted source reduction assessments for over 200 businesses, of which a sample of 38 companies found cost savings of $2.5 million as a result of these assessments. DOE has conducted some 4,100 audits which have resulted in savings of $419 million and 77 trillion British thermal units of energy.

New section 305 of the Stevenson-Wydler Act establishes an industry-led Manufacturing Advisory Committee. New subsection (a) states that the Director of OSTP, after consultation with the Secretary and other appropriate Federal officials, shall establish a Manufacturing Advisory Committee (hereafter in this new section referred to as the 'Committee'), led by U.S. industry officials, to provide to the Director of the OSTP advice and, as appropriate, guidance to Federal manufacturing programs.

New section 305(b) states that the Committee shall—

(1) collect and analyze information on the range of factors which determine the success of United States-based manufacturing industries, and particularly factors regarding the development and deployment of advanced manufacturing technologies and the application of best manufacturing practices;

(2) identify areas where appropriate cooperation between the Federal Government and industry and labor, including Government support for industry-led joint research and development ventures and for manufacturing extension activities, would enhance U.S. industrial competitiveness, and provide advice and guidance for such cooperative efforts;

(3) provide guidance on what Federal policies and practices are necessary to strengthen U.S.-based manufacturing, particularly Federal policies and practices regarding research budgets, interagency coordination and initiatives, technology transfer, regulation, and procurement; and

(4) generally develop recommendations for guiding Federal agency and interagency activities related to U.S.-based manufacturing.

New section 305(c) states that the Committee shall be composed of 16 members, of whom—

(A) six members shall be the OSTP Director, the DOC Secretary, the DOD Secretary, the DOE Secretary, the Secretary of Labor, and the NSF Director, of their designees; and

(B) ten members shall, within 120 days after the date of enactment of this title, be appointed by the President, acting through the OSTP Director, from the private manufacturing industry, worker organizations, technical and professional societies, State technology agencies, and academia.

At least two of the members appointed shall be from small business. In addition, the Director of OSTP or such Director's designee shall chair the Committee. The chairman shall call the first meeting of the Committee within 30 days after the appointment of members is completed. The Committee may use such personnel detailed from Federal agencies as may be necessary to enable it to perform its functions. Nine members of the Committee shall constitute a quorum for the transaction of business. Members of the Committee, other than full-time employees of the Federal Government, while attending meetings of the Committee or otherwise performing duties of the Committee while away from their homes or regular places of business, shall be allowed travel expenses in accordance with subchapter I of chapter 57 of title 5, United States Code. After its establishment, the Committee shall submit a report of its activities once every year to the President, the Committee on Commerce, Science, and Transportation of the Senate, and the Committee on Science, Space, and Technology of the House of Representatives. The Committee, as appropriate, shall work with the Commerce Technology Advisory Board established under section 113 of the Stevenson-Wydler Act and with other appropriate Federal advisory mechanisms to ensure integrated Federal-private consideration of technology and manufacturing policies and programs.

New section 305(d) states that there are authorized to be appropriated to carry out this section such sums as may be necessary for FYs 1994 and 1995.

SEC. 213.—MISCELLANEOUS AND CONFORMING AMENDMENTS

Subsection (a) amends section 4 of the Stevenson-Wydler Act (15 U.S.C. 3703) by adding definitions of: "Director" (Director of NIST); "Institute" (NIST); "Assistant Secretary" (Assistant Secretary of Commerce for Technology Policy); "advanced manufacturing technology"; and "modern technology".

Subsection (b) redesignates existing sections of the Stevenson-Wydler Act as sections of two new titles: title I, Commerce Department and Related programs; and title II, Federal Technology Transfer.

SEC. 214.—MANUFACTURING TECHNOLOGY CENTERS

Subsection (a) amends section 25(a) of the NIST Act (15 U.S.C. 278k(a)) by adding the following to the list of the means by which MTCs are to achieve their objective:

(1) the active dissemination of information on advanced workplace practices and available education and training programs, and the encouragement of companies to train workers in the effective use of modern and advanced manufacturing technologies; and

(2) demonstration projects in which MTCs work with States, local governments, community development organizations, worker and business organizations, and community banks to create a business climate supportive of high-performance manufacturing.

This provision is intended to make clear that MTCs can and should work closely with other organizations, both Government-supported and private, which provide advice or assistance to small- and medium-sized manufacturers. The MTCs are not to duplicate the services that other organizations provide, but rather to work with these organizations and, as appropriate, refer interested small companies to these services. For example, while MTCs inevitably provide some informal training to company employees regarding new equipment and business practices, the MTCs as a rule should not, duplicate training programs which already exist in the States. However, the MTCs can provide referral to such programs. In this sense, MTCs can provide "one-step shopping"—contact points at which interested small businesses can obtain not only MTC services but also ready referrals to other services. Similarly, this provision is intended to make clear that MTCs are authorized to participate in demonstration projects in which they would work with others, including banks and community development organizations, to create a business climate supportive of high-performance manufacturing. This provision is based on the premise that the overall context in which manufacturing modernization takes place is an important factor in the success of a company's efforts. Community bank lending practices, local zoning rules, State and local government tax policies, and the education system, among other factors, all play important roles in creating an environment which can be supportive of or hostile to the adoption of high-performance manufacturing techniques. Private and public economic development organizations are now establishing projects in which they try systematically to help a large number of small firms in a given region to modernize. One notable example is in the region of western Pennsylvania, northern West Virginia, and eastern Ohio. It is appropriate for MTCs to use some of their Federal funding to participate in relevant portions of such cooperative ventures in order to make clear that working within this large context on behalf of a manufacturing client is an appropriate function of an MTC.

Subsection (a) also amends section 25(b) of the NIST Act (15 U.S.C. 278k(b)) by adding to the list of authorized MTC activities the following: (1) assessments of client firms' modernization needs, (2) assistance in implementing quality processes, and (3) where needed, cooperation with training institutions to ensure that employees, particularly production workers, receive training in the most effective use of manufacturing technology and advanced workplace practices.

Subsection (a) amends section 25(c)(5) of the NIST Act (15 U.S.C. 278k(c)(15)) by providing that MTCs which pass their third-year reviews shall be eligible in subsequent years to receive one-third Federal funding. Each MTC which receives financial assistance under this section shall be evaluated during its sixth year of operation, and at such subsequent times as the Secretary considers appropriate, by an evaluation panel appointed by the Secretary in the same manner as was the evaluation panel previously appointed. The Secretary shall not provide funding for additional years of the MTC's operation unless the evaluation is positive and the Secretary finds that continuation of funding furthers the goals of the MTC program. Such additional Federal funding shall not exceed one-third of the cost of the MTC's operations.

This amendment regarding out-year Federal funding for MTCs is intended to ensure that MTCs which maintain the high level of quality necessary to pass NIST evaluations will continue to receive government funding that will enable them to reach new small- and medium-sized businesses, provided that the Secretary concludes that there is a continuing need for a Federal contribution to an

MTC in a particular region. Even if an MTC is of high quality, there may be no need for further Federal funding. It is intended that the Secretary shall have the discretion to make such a decision.

It is reasonable and expected that MTCs will charge cost-reimbursable fees to those small manufacturers that seek in-depth services, but to place MTCs solely on a fee-for-service basis would prohibit them from reaching and providing initial help to the very small manufacturers that the MTC program was created to assist. However, limiting MTCs to only one-third Federal funding in out-years is intended to ensure that they meet a market test in terms of finding and providing in-depth services to clients who will pay for MTC services.

The Committee directs NIST to continue its current policy of developing and applying thorough evaluation procedures for the MTCs, including devising metrics which reliably measure how well any given MTC serves its clientele.

Also regarding the MTC program, the DOC Inspector General (IG) should focus on two critical tasks: investigating credible reports of waste, fraud, or abuse, should any such reports ever arise; and providing advice, when explicitly asked by NIST management, on financial auditing processes. However, given that these two missions are so important and IG resources so limited, the IG should avoid spending time and resources on reviewing or commenting on the normal day-to-day management of the MTC effort or any other NIST program. Routine program management is best left to the appropriate NIST officials.

Finally, subsection (a) amends section 25 of the NIST Act (U.S.C. 278k et seq.) by adding at the end a new subsection (d) that states that if an MTC receives a positive evaluation during its third year of operation, the Director may, any time after that evaluation, contract with the MTC to provide additional technology extension or transfer services above and beyond the baseline activities of the MTC. Such additional services may include, but are not necessarily limited to, the development and operation of the following:

(1) services focused on the testing, development, and application of manufacturing and process technologies within specific technical fields such as advanced materials or electronics fabrication for the purpose of assisting U.S. companies, both within the MTC's original service region and in other regions, to improve manufacturing, product design, workforce training, and production in those specific technical fields;

(2) assistance to small- and medium-sized firms in fields of manufacturing other than the field or fields originally served by the MTC;

(3) industrial service facilities which provide tools to help companies with the low-cost, low-volume rapid prototyping of a range of new products and the refinement of the manufacturing and process technologies necessary to make such products;

(4) programs to assist small- and medium-sized manufacturers and their employees, particularly production workers, in the MTC's region to learn and apply the technologies, techniques, and processes associated with systems management

technology, electronic commerce, pollution minimization, or the improvement of manufacturing productivity; and

(5) industry-led demonstration programs that explore the value of innovative nonprofit manufacturing technology consortia to provide ongoing research, technology transfer, and worker training assistance for industrial members—an award under this paragraph shall be for no more than $500,000 per year, and shall be subject to renewal after a 1-year demonstration period.

Subsection (b) states that the effective date of section 25(c)(5) of the NIST Act, as amended by subsection (a) of this section, is August 23, 1988.

This subsection is intended to make clear that any MTC which has been created prior to the date of enactment of this legislation shall be eligible, if that MTC passed its third-year review, for Federal funding at the one-third rate for each year it would have under the earlier law received less than one-third Federal funding. Beyond the sixth year of Federal funding, each such MTC must pass subsequent evaluations in order to be eligible for continued Federal funding at the one-third rate.

SEC. 215.—STATE TECHNOLOGY EXTENSION PROGRAM

Subsection (a) states that section 26(a) of the NIST Act (15 U.S.C. 278*l*(a)) is amended to make clear that it establishes within NIST a STEP.

Subsection (b) states that section 26 of the NIST Act (15 U.S.C. 278*l*) is amended by adding at the end a new subsection (c) which says that in addition to the general authorities listed in subsection (b), STEP also shall, through merit-based competitive review processes and as authorizations and appropriations permit—

(1) make awards to States and conduct workshops, pursuant to section 5121(b) of the Omnibus Trade and Competitiveness Act of 1988 NIST Act (15 U.S.C. 278*l* note) in order to help States improve their planning and coordination of technology extension activities;

(2) assist States, particularly States which historically have had no manufacturing or technology extension programs or only small programs, to plan, develop, and coordinate such programs and to help bring those State programs to a level of performance where they can apply successfully for awards to establish MOCs, MTCs, or both;

(3) support industrial modernization demonstration projects to help States create networks among small manufacturers for the purpose of facilitating technical assistance, group services, and improved productivity and competitiveness;

(4) support State efforts to develop and test innovative ways to help small- and medium-sized manufacturers improve their technical capabilities, including, as appropriate, State contracts with private-sector technology transfer companies to provide technology assistance and development services that are beyond the current capacity of a given State's industrial extension activities;

(5) support State efforts designed to help small manufacturers in rural as well as urban areas improve and modernize

their technical capabilities, including, as appropriate, interstate efforts to achieve such end;

(6) support State efforts to assist interested small defense manufacturing firms to convert their production to nondefense or dual-use purposes;

(7) support worker technology education programs in the States at institutions such as research universities, community colleges, technical and professional societies, labor education centers, labor-management committees, and worker organizations in production technologies critical to the Nation's future, with an emphasis on high-performance work systems, the skills necessary to use advanced manufacturing system well, and best production practice; and support on-the-job training programs in the States to build and enhance the skills of employees, particularly production workers, in small- and medium-sized companies; and

(8) help States develop programs to train personnel who in turn can provide technical skills to managers and workers of manufacturing firms.

SEC. 216.—AMERICAN WORKFORCE QUALITY

Subsection (a) states that in addition to existing responsibilities and authorities prescribed by law, the Secretary, through the Director and after consultation with the Secretary of Labor, shall direct MTCs and MOCs to utilize, when appropriate, their expertise and capability to assist managers and workers in United States manufacturing firms in effectively utilizing and operating advanced manufacturing technologies and modern technologies—

(1) by making available assessments of the needs of U.S. manufacturing firms for worker training in the effective utilization and operation of specific technologies the firms have adopted or are planning to adopt;

(2) by making available to U.S. manufacturing firms information on commercially and publicly provided worker training services, including those provided by U.S. sources of technologies, in the effective utilization and operation of specific technologies the firms have adopted or are planning to adopt; and

(3) by providing information to client firms and their workers to enable them effectively to utilize and operate specific technologies that the firms have adopted or plan to adopt.

Subsection (b) states that, in addition to existing responsibilities and authorities prescribed by law, the Secretary, through the Director and in consultation with the Secretary of Labor and other appropriate Federal officials and with leaders of industry and labor, shall assist managers and other workers in U.S. manufacturing firms in effectively utilizing and operating advanced manufacturing technologies and modern technologies—

(1) by establishing and managing a clearinghouse for information, to be available through an appropriate entity to the MTCs, to the MOCs when they are established, to other technology training entities, or directly to U.S. manufacturing firms, on the best available training material and services for

the effective utilization and operation of specific advanced and modern technologies;

(2) by encouraging U.S. providers of advanced and modern technologies for manufacturing firms to develop training material specifically designed for the managers and other workers responsible for utilizing and operating such technologies; and

(3) by establishing as an important criterion in the assessment of advanced and modern technologies the availability of training material specifically designed for the mangers and other workers responsible for utilizing and operating such technologies.

SEC. 217.—REPORT ON OPTIONS FOR ACCELERATING THE ADOPTION OF NEW MANUFACTURING EQUIPMENT

This section states that within 1 year after the date of enactment of this legislation, the Secretary shall submit to Congress a report on—

(1) the degree to which manufacturing enterprises in the United States have difficulty obtaining financing for the purpose of purchasing new equipment and modernizing operations;

(2) the policies and practices followed in other industrialized countries to help manufacturing firms obtain financing for modernization;

(3) the advantages, disadvantages, and costs of major options by which the Federal Government might help stimulate the flow of capital to manufacturers and thus accelerate industrial modernization, including—

  (A) creation of a Government-sponsored enterprise to stimulate the flow of capital to manufacturing;

  (B) increasing technical advice to banks and other financial institutions, perhaps through the National Manufacturing Outreach Program, in order to increase their ability to judge whether or not individual manufacturers have sound modernization plans;

  (C) cooperation between extension activities supported under the MEP and manufacturing equipment leasing firms in order to provide manufacturers with additional information or equipment leasing options; and

  (D) tax incentives.

SUBTITLE B.—NATIONAL SCIENCE FOUNDATION MANUFACTURING PROGRAMS

SEC. 221.—NATIONAL SCIENCE FOUNDATION MANUFACTURING ACTIVITIES

Subsection (a) provides that the Director of NSF, after, as appropriate, consultation with the Secretary, the Under Secretary, and the NIST Director, shall—

(1) work with U.S. industry to identify areas of research in manufacturing technologies and practices that offer the potential to improve U.S. productivity, competitiveness, and employment;

(2) support research at U.S. universities to improve manufacturing technologies and practices; and

(3) work with DOC's Technology Administration and NIST and, as appropriate, other Federal agencies to accelerate the transfer to U.S. industry of manufacturing research and innovations developed at universities.

Subsection (b) states that the NSF Director shall strengthen and expand the number of Engineering Research Centers (ERCs) and strengthen and expand the Industry/University Cooperative Research Centers (IUCRC) Program with the goals of increasing the engineering talent base versed in technologies and workplace practices critical to the Nation's future, with emphasis on advanced manufacturing, and of advancing fundamental engineering knowledge in these technologies. At least one ERC shall have a research and education focus on the concerns of traditional manufacturers, including small- and medium-sized firms that are trying to modernize their operations. Awards under this subsection shall be made on a competitive, merit review basis. Such awards may include support for acquisition of instrumentation, equipment, and facilities related to the research and education activities of the centers and support for undergraduate students to participate in the activities of the centers.

Subsection (c) states that the NSF Director, in consultation with the Secretary, may establish a program to provide traineeships to graduate students at institutions of higher education within the United States who choose to pursue masters or doctoral degrees in manufacturing or industrial engineering.

Subsection (d) states that the NSF Director, in consultation with the Secretary, may establish a program to provide fellowships, on a cost-shared basis, to individuals from industry with experience in manufacturing to serve for 1 or 2 years as instructors in manufacturing at 2-year community and technical colleges in the United States. In selecting fellows, the NSF Director shall place special emphasis on supporting individuals who not only have expertise and practical experience in manufacturing but who also will work to foster cooperation between 2-year colleges and nearby manufacturing firms.

Subsection (e) states that the NSF Director, in consultation with the Secretary, the Under Secretary, and the NIST Director, may establish a program to develop innovative curricula, courses, and materials for use by institutions of higher education for instruction in total quality management and related management practices, in order to help improve the productivity of United States industry.

Overall, subtitle B recognizes that NSF has played an important role, and should continue to play an important role, in connecting the best research and education in academic institutions with the development of world-class industrial technologies and practices. NSF's success in finding ways to connect academic research to industrial issues is demonstrated in the 18 ERCs and 50 IUCRCs that it currently supports. The centers bring together faculty, students, and industrial professionals from various disciplines to address fundamental research issues crucial to the next generation of technological advances. Such centers are particularly important in manufacturing, where new research and technologies are evolving quickly and where rapid application of new technology to industry is particularly important to U.S. industrial competitiveness. This provision authorizes NSF to expand the number of centers assisting U.S. manufacturing. The agency is expected to retain merit review and the flexibility to choose the most promising applicants.

In the training area, graduate traineeships have proven to be an excellent vehicle for transferring technology from universities to industry. The Manufacturing Managers in the Classroom initiative will provide a useful exchange of expertise from industry to academic institutions. Finally, a program to expand the teaching of total quality management in higher education, through NSF support of new curricula and materials, will help to improve the education of tomorrow's industrial engineers and managers and thus help to boost U.S. industrial productivity.

TITLE III.—CRITICAL TECHNOLOGIES

SEC. 301.—FINDINGS

This section states that the Congress finds that—

(1) the rapid, effective use of advanced technologies in the design and production of products is a key determinant of economic competitiveness;

(2) investment in the development and adoption of advanced technology contributes significantly to long-term economic growth and employment;

(3) the governments of our most successful competitor nations in the global marketplace have created supportive structures and programs that have been effective in helping their domestic industries increase their global market shares;

(4) agriculture and aerospace are two examples of industries that have achieved commercial success with strong support from the U.S. Government; and

(5) The U.S. Government must promote and facilitate the creation, development, and adoption of advanced technologies, including skills-based production technologies, to ensure long-term economic prosperity for the United States.

SEC. 302.—DEVELOPMENT OF PLAN FOR THE ADVANCED TECHNOLOGY PROGRAM

This section states that the Secretary, acting through the Under Secretary and the Director, shall, within 6 months after the date of enactment of this legislation, submit to Congress a plan for the expansion of the ATP established under section 28 of the NIST Act (15 U.S.C. 278n), with specific consideration given to—

(1) closer coordination and cooperation with ARPA and other Federal research and development agencies as appropriate;

(2) establishment of temporary staff positions that can be filled by industrial or technical experts for a period of 1 to 2 years;

(3) ensuring that the Program will have a meaningful impact on the commercialization of a broad range of new technologies and on the refinement of critical manufacturing technologies;

(4) changes that may be needed when annual funds available for grants under the Program reach levels of $200,000,000 and $500,000,000; and

(5) administrative steps necessary for Program support of large-scale industry-led consortia similar to, or possible eventually including, the Semiconductor Manufacturing Technology Institute.

In preparing this ATP plan, the Secretary is directed to address, among other topics, the following questions. First, what investment strategy should a larger ATP follow? Does the biggest benefit for the Nation lie in a program which continues to focus primarily on supporting the development or new generic technologies? Or should the program also explicitly ask key industries (both existing sectors and emerging new ones) which technologies are most important to them and then encourage applications which would help broad groups of companies in those sectors? Second, are there particular technology projects that would have special benefits to the overall economy? For example, should the ATP (along with NIST's laboratory programs) encourage industry proposals which would facilitate new voluntary standards in important areas such as the interoperability of computer networks? Third, will the ATP be most useful to the Nation in the long-term if it focuses its resources on small- and medium-sized firms, or if it focuses on helping small businesses to become more viable suppliers of critical technology components? To help answer these questions, the Secretary is directed to obtain advice and information from a broad cross section of U.S. industry on the ways in which the ATP can best help U.S. technological competitiveness.

SEC. 303.—ADVANCED TECHNOLOGY PROGRAM SUPPORT OF LARGE-SCALE JOINT VENTURES

This section states that section 28 of the NIST Act (15 U.S.C. 278n) is amended by adding at the end a new subsection (k) which says that in addition to the general authority under such section 28 to provide financial assistance to joint ventures, the Secretary, through the Director, also may, as permitted by levels of authorizations and appropriations, provide financial support to large-scale joint ventures requesting $20 million or more a year in DOC funds. Any such support shall be subject to the matching funds requirements of section 28(b)(1)(B)(ii), except that the Secretary may provide assistance to such large-scale joint ventures for up to 7 years. The Secretary may work with industrial groups to develop such proposed large-scale joint ventures and shall give preference to proposals which represent a broad spectrum of companies for a given industry and which focus either on speeding the commercialization of important new technologies or on accelerating the development, testing, and deployment of valuable new process technologies and workplace practices. The Secretary and Director, as appropriate, shall obtain independent technical review of industry proposals submitted under this new subsection (k).

The Secretary is directed, when obtaining independent technical review of these large-scale joint venture proposals, to seek the advice of industry experts, particularly representatives of companies that would be potential customers of the products or services developed by a joint venture.

SEC. 304.—TECHNICAL AMENDMENTS

Subsection (a) further amends section 28 of the NIST Act (15 U.S.C. 278n) by allowing "other transactions" in addition to grants and contracts; by allowing ATP winners the option of providing either a minority share of the total cost of such joint ventures for up to 5 years, or only direct costs (and not indirect costs, profits, or management fees), for up to 5 years; and by providing that the "other transactions" authority may be used when the Secretary, acting through the Director, determines that standard contracts, grants, or cooperative agreements are not feasible or appropriate, and only when other transaction instruments incorporate terms and conditions that reflect the use of generally accepted commercial accounting and auditing practices.

Furthermore, section 28 is amended by adding a new subsection (1) which allows the Director to grant an extension of not to exceed 6 months beyond the deadlines established under subsections (b)(1)(B)(ii) and (d)(3) for joint venture and single-applicant awardees to expend Federal funds to complete their projects, if such extension may be granted with no additional cost to the Federal Government.

A new subsection 28(m) states that the Secretary, Under Secretary, and Director may organize or attend workshops or use other mechanisms to encourage the leaders of specific United States industrial sectors to—

(1) identify which precompetitive, generic technologies will be most critical in the future to each such sector and, as appropriate, encourage the formation broad-based industry-led joint ventures which seek to develop those technologies; and

(2) analyze which additional steps may be necessary to enable each sector to acquire, deploy, and finance needed technologies in a timely fashion.

Subsection (b) amends section 201(d) of the American Technology Preeminence Act of 1991 (Pub. L. 102–245; 106 Stat. 19) by inserting ", except in the case of the amendment made by subsection (c)(6)(A)" immediately after "enactment of this Act".

SEC. 305.—TECHNOLOGY FINANCING PILOT PROGRAM

Subsection (a) states that Congress finds and declares the following:

(1) In recent years, U.S. technology firms appear to have had increasing difficulty financing the development and early-stage commercialization of important new critical civilian technologies. Venture capital is less available than in past years, banks appear less willing to provide loans, and medium-sized as well as small companies often have difficulty under current capital market conditions financing promising long-term technology projects.

(2) Difficulties in obtaining financing particularly hurts those technology firms which face foreign competitors which have received substantial direct or indirect financial help from their governments.

(3) The Nation would benefit from a technology financing pilot program to experiment with assisting private-sector venture capital entities which in turn can select and support the most promising and valuable long-term U.S. technology projects.

Subsection (b) states as a pilot program, the Secretary, through the Under Secretary and in consultation with the Administrator of the Small Business Administration (hereafter in this section referred to as the "Administrator"), may license and, to the extent provided in advance in appropriations Act and in accordance with the plan developed under subsection (e), financially assist private-sector entities to be know as civilian technology investment companies, for the purpose of stimulating and expanding the flow of private capital to eligible technology firms and joint ventures of eligible technology firms. Each civilian technology investment company licensed under this section may provide venture capital and loans to eligible technology firms and joint ventures in such manner and under such terms as the licensee may fix in accordance with regulations of the Secretary. Civilian technology investment companies may provide venture capital and loans directly or in cooperation with other investors. Each civilian technology investment company shall have authority to borrow money and to issue its debenture bonds, promissory notes, or other obligations under such general conditions and subject to such limitations and regulations as the Secretary may prescribe. In order to encourage the formulation and growth of civilian technology investment companies pursuant to this section, the Secretary is authorized, when funds are previously made available in appropriations Acts, to—

(A) purchase, or guarantee the timely payment of up to 100 percent of principle and interest as scheduled on, debentures issued by such companies, on such terms and conditions as the Secretary deems appropriate pursuant to regulations issued under subsection (e); and

(B) purchase nonparticipating or participating, nonvoting preferred securities and issue trust certificates representing ownership of all or part of such preferred securities.

In addition, guarantees and purchases of debentures and preferred securities under this subsection shall be made on such terms and conditions as are necessary to ensure that the cost of the program established under this section shall not exceed 15 percent of its corresponding credit authority in any fiscal year. For purposes of this paragraph, the term 'cost' shall have the same meaning given such term in section 502(5) of the Federal Credit Reform Act of 1990, and the term 'credit authority' shall have the same meaning given such term in section 3(10) of the Congressional Budget Act of 1974.

Subsection (c) states that the Secretary shall require that any civilian technology investment company licensed and assisted under this section shall—

(1) focus primarily on providing patient early-stage capital, either loans or equity investments, to eligible technology firms in the United States, including joint ventures of eligible firms, in order to help those firms finance and accelerate the develop-

ment and early-stage commercialization of critical civilian technologies;

(2) support critical civilian technology projects, particularly those undertaken by eligible technology firms whose net worth is $50,000,000 or less;

(3) demonstrate to the Secretary credible procedures for ensuring that investments are made in critical technology projects for which eligible firms cannot obtain necessary financing solely through commercial capital markets; and

(4) demonstrate to the Secretary working relationships with either NIST, universities, research bodies, technology transfer centers, or other organizations that can assist such licensee to identify and evaluate projects to be supported under this section.

Subsection (d) provides that amounts received by the Secretary from the payment of dividends, any profit participation, and the redemption of securities pursuant to this section, and fees paid to the United States by a civilian technology investment company licensed pursuant to this section, shall be deposited in an account established by the Secretary and shall be available solely for carrying out this section, to the extent provided in advance in appropriations Acts.

It is intended that the Secretary have the discretion to decide whether to require profit participation.

Subsection (e) states that the Secretary, acting through the Under Secretary and in coordination with the Administrator, and in consultation with other appropriate Federal officials, the States, industry, the financial community, and other appropriate parties, shall prepare and submit to Congress on or before January 1, 1994, an operating plan to carry out this section. In preparing such plan, the Secretary shall consider and evaluate approaches to achieving the purpose of this section and shall develop recommendations, as appropriate, to fulfill this section's objective to help technology firms in the United States to develop and commercialize critical civilian technologies. Such evaluations and recommendations shall be included in the plan submitted to Congress under this subsection. The Secretary, in consultation with the Administrator, shall promulgate such regulations as may be necessary to carry out the provisions of this section and may contract with other agencies for administrative services to help carry out this section. Except for the operating plan requirement, the provisions of this section shall not take effect until October 1, 1994. After appropriations are provided for the pilot project authorized under this section, the Secretary, after consultation with the Administrator, shall evaluate annually the effectiveness of the program and submit an annual report to appropriate committee of Congress on the findings resulting from such evaluation. Such report shall contain, on a confidential basis, appendices which include, but are not necessarily limited to, the type and amount of assistance provided to licensees under this section, key characteristics of licensees, the number and size in net worth of the technology firms and joint ventures assisted by each licensee, the amount of assistance provided to each technology firm or joint venture, and the types of technology each such technology firm or joint venture is developing and commercializing.

Subsection (f) provides definitions for two terms: "critical civilian technology" and "eligible technology firm".

In preparing the operating plan required under this section, the Secretary is directed to include in the technology financing pilot program, as much as it appropriate, the following features: the civilian technology investment companies licensed under the program are administered by experienced personnel with proven track records in financing the development and early-stage commercialization of critical civilian technologies; the program is structured to delegate authority and decisionmaking to the licensed administrators of funds; the investment decisions are made by the civilian technology investment companies under broad guidelines developed by the Secretary in conjunction with private-sector representatives; the decisionmaking processes for the program are focused on value creation, timeliness, and reward the fast cycle time results; and management fee and return goals are structured so as to encourage investments in companies with projected growth rates close to industry averages.

SEC. 306.—TECHNOLOGY MONITORING AND COMPETITIVENESS ASSESSMENT

This section amends section 101(e) of the Stevenson-Wydler Act, as redesignated by section 213(b)(2) of this legislation, to direct the Secretary, through the Under Secretary, to establish within the Technology Administration an Office of Technology Monitoring and Competitiveness Assessment, to collect, evaluate, assess, and disseminate information on—

(A) foreign science and technology, specifically information assessing foreign capabilities relative to the United States;

(B) policies and programs used by foreign governments and industries to develop and apply economically important critical technologies, how these policies and programs compare with public and private activities in the United States, and the effects that these foreign policies and programs have on the competitiveness of U.S. industry; and

(C) the way in which the economic competitiveness of U.S. industry can be enhanced through Federal programs, including DOC programs, and evaluation of the effectiveness of Federal technology programs in helping to promote U.S. industrial competitiveness and economic growth.

Based on the information gathered, the President, with the assistance of the Secretary, shall submit to Congress an annual report on U.S. technology and competitiveness analyzing the condition of U.S. technology relative to major trading partners, key trends in foreign technology and competitiveness policies and targeting, and the degree to which Federal programs are helping the United States to stay competitive with other countries and create domestic employment opportunities.

In addition, the Office of Technology Monitoring and Competitiveness Assessment, in cooperation with NTIS, is authorized to—

(A) act as a focal point within the Federal Government for the collection and dissemination, including electronic dissemination, of information on foreign process and product technologies, including information collected under the Japanese Technical Literature Program;

(B) work and, as appropriate, enter into cooperative arrangements with sector-specific industry trade associations or consortia to define the information desired by industry;

(C) compile and make available the extensive foreign technology monitoring and assessment information already collected and analyzed by the Federal Government;

(D) as appropriate, enter into controlled access agreements with other Federal agencies to fill the industry's information needs;

(E) act as an electronic clearinghouse for this information or otherwise provide for this function;

(F) direct and fund the collection of additional information;

(G) direct and fund analysis of foreign research and development activities, technical capabilities, workplace practices, particularly in technical areas where the United States is considered to be at par or lagging foreign capabilities;

(H) establish a program to identify technical areas needing a full-scale technical evaluation, and provide, on a cost-shared basis to private sector or government-industry joint ventures, grants to conduct the evaluation;

(I) establish and administer a fellowship program to support Technology Fellows in those countries that are major competitors of the United States in critical technologies to collect and provide initial analysis of information on foreign science and technology capabilities; and

(J) work with the Department of State to place technical experts from the Institute and other Federal laboratories into U.S. embassies to serve as technology attachés and counselors.

In implementing this section, the Secretary and DOC are urged to survey and evaluate existing data collection and analysis efforts already underway throughout the executive branch and ensure that the best available resources are utilized, that information is adequately disseminated to the private sector, and that multiple assessment activities are not needlessly pursued.

SEC. 307.—COMMERCE TECHNOLOGY ADVISORY BOARD

This section adds a new section 113 to the Stevenson-Wydler Act. This new section 113 states that there is established a Commerce Technology Advisory Board (hereafter in this section referred to as the "Advisory Board"), the purpose of which is to advise the Secretary, Under Secretary, and Director regarding ways in which to—

(1) promote the development and rapid application of advanced commercial technologies, including advanced manufacturing technologies such as skill-based production technologies;

(2) strengthen the programs of the Technology Administration; and

(3) generally improve the global competitiveness of industries within the United States.

New subsection 113(b) states that the Advisory Board shall be composed of at least 17 members, appointed by the under Secretary from among individuals who, because of their experience and accomplishments in technology development, business development, or finance are exceptionally qualified to analyze and formulate policy that would improve the global competitiveness of industries in the United States. The Under Secretary shall designate one member to serve as chairman. Membership of the Advisory Board shall be composed of—

(1) representatives of U.S. small businesses; other U.S. businesses; research universities and independent research institutes; State and local government agencies involved in industrial extension; national laboratories; industrial, worker, and technical organizations; and

(2) other individuals that possess important insight to issues of national competitiveness.

Since this provision is intended to ensure that DOC receives the best possible advice in its efforts to improve the global competitiveness of U.S. industries, a majority of the Advisory Board's members should be individuals who have both industrial experience and substantial technical expertise. Also, the Committee directs the Secretary to establish additional mechanisms for providing industry expertise and advice at various working levels within DOC. Finally, in order to help to ensure that various DOC advisory bodies work together, it is intended that the Secretary and the Under Secretary ensure that the Advisory Board and the Manufacturing Advisory Committee established elsewhere in this legislation work together and with other current and future Cabinet-level and sub-Cabinet-level committees created to provide advice to the Federal Government on issues related to manufacturing and technology. These committees shall establish communication and coordination mechanisms to ensure an integrated consideration of policies and recommendations related to manufacturing and technology—mechanisms such as periodic joint meetings, regular exchanges of information and committee agendas, and sharing reports and recommendations.

New section 113(c) states that the chairman shall call the first meeting of the Advisory Board not later than 90 days after the date of enactment of this section. The Advisory Board shall meet at least once every 6 months, and at the call of the Under Secretary.

New section 113(d) states that members of the Advisory Board, other than full-time employees of the United States, shall be allowed travel expenses in accordance with subchapter I of chapter 57 of title 5, United States Code, while engaged in the business of the Advisory Board.

New section 113(e) states that in carrying out this section, the Under Secretary shall consult with other agencies, as appropriate. The Advisory Board, as appropriate, shall establish communication and coordination mechanisms with other Federal advisory committees to help ensure integrated Federal-private consideration of technology and manufacturing policies and programs.

New section 113(f) states that section 14 of the Federal Advisory Committee Act shall not apply to the Advisory Board.

SEC. 308.—STUDY OF SEMICONDUCTOR LITHOGRAPHY TECHNOLOGIES

This section states that within 9 months after the date of enactment of this legislation, the Critical Technologies Institute (in this section referred to as the "Institute") established under section 822 of the National Defense Authorization Act for Fiscal Year 1991 (42 U.S.C. 6686) shall, after consultation with the private sector and appropriate officials from other Federal agencies, submit to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives a report on advanced lithography technologies for the production of semiconductor devices. The report shall include the Institute's evaluation of the likely technical and economic advantages and disadvantages of each such technology, an analysis of current private and Government research to develop each such technology, and any recommendations the Institute may have regarding future Federal support for research and development in advanced lithography. To the extent appropriate, the Institute shall draw upon technical and business analyses of advanced lithography technologies prepared by or for major trade associations and professional and technical societies.

TITLE IV.—ADDITIONAL COMMERCE DEPARTMENT PROVISIONS

SEC. 401.—INTERNATIONAL STANDARDIZATION

Subsection (a) states that Congress finds that—

(1) private sector consensus standards are essential to the timely development of competitive products;

(2) Federal Government contributions of resources and more active participation in the voluntary standards process in the United States can increase the quality of United States standards, increase their compatibility with the standards of other countries, and, where appropriate, through government-to-government negotiations, ease access of U.S.-made products to foreign markets; and

(3) the Federal Government, working in cooperation with private sector organizations including trade associations, engineering societies, and technical bodies, can effectively promote Federal Government use of U.S. consensus standards and, where appropriate, the adoption and Federal Government use of international standards.

Subsection (b) amends section 104(e) of the American Technology Preeminence Act of 1991 (Pub. L. 102–245; 106 Stat. 10) by striking "matching finds" and inserting in lieu thereof "financial contributions deemed appropriate by the Secretary"; and by adding a new paragraph (2) which states that as necessary and appropriate, NIST shall expand the program established under section 112 of the NIST Authorization Act for Fiscal Year 1989 (15 U.S.C. 272 note) by extending the existing standards pilot program to include other countries that prefer to discuss their standards-related activities with official representatives of the Federal Government. NIST may enter into additional contracts with non-Federal organizations representing U.S.-owned companies, as such term is defined in section 28(j)(2) of the NIST Act (15 U.S.C. 278n(j)(2)). Such contracts shall require costsharing between Federal and non-Federal sources for such purposes. In awarding such contracts, NIST shall seek to promote and support the dissemination of U.S. technical standards to additional foreign countries and shall seek, as the Director deems appropriate, to promote the adoption of international standards supported by U.S. industry. NIST and such contractors shall, in pursuing this mission, cooperate with governmental bodies, private organizations including standards-setting organizations and industry, and multinational institutions that promote economic development. The organizations receiving such contracts may establish training programs to bring to the U.S. foreign standards experts for the purpose of receiving in-depth training in the U.S. standards system.

Subsection (c) amends section 508(a) of the American Technology Preeminence Act of 1992 (15 U.S.C. 3701 note) by adding standards development and the Federal role in standards development as two topics to be discussed in the National Research Council report on international standards required in that section.

In addition, the Secretary, in consultation with NIST and the Commerce Technology Advisory Board and with, as appropriate, the active participation of the private sector, shall submit to Congress a report describing the appropriate roles of DOC in aid to U.S. companies in qualifying their products in foreign markets through the development and promulgation of domestic and global product and quality standards and through the implementation of conformity assessment and accreditation procedures based upon such standards, including a discussion of the extent to which each of the policy options provided in the March 1992 Office of Technology Assessment report on global standards, contributes to meeting the goals of—

(A) increasing the international adoption of standards beneficial to U.S. industries; and

(B) improving the coordination of U.S. representation at international standards-setting bodies.

SEC. 402.—MALCOLM BALDRIGE AWARD

Subsection (a) amends section 108(c)(1) of the Stevenson-Wydler Act (as redesignated by this bill), a provision which deals with the Malcolm Baldrige National Quality Award Program, by adding educational institutions as a category of organization eligible to receive the Baldrige Awards. Within 1 year after the date of enactment of this legislation, the Secretary shall submit to Congress a report containing criteria for qualification for a Malcolm Baldrige National Quality Award by various classes of educational institutions; criteria for the evaluation of applications for each such award; and a plan for funding such awards. In preparing this report, the Secretary shall consult with NSF and other public and private entities with appropriate expertise, and shall provide for public notice and comment. The Secretary shall not accept applications for awards to educational institutions until after the report is submitted to Congress.

Subsection (b) states that the Baldrige Award provision is further amended by requiring that no award shall be made within any category or subcategory if there are no qualifying enterprises in that category or subcategory.

Subsection (c) further amends the Baldrige Award provision by providing that a National Quality Laboratory is established within NIST, the purpose of which is to perform research and outreach activities to assist private sector quality efforts and to serve as a mechanism by which U.S. companies, universities, and NIST can work together to advance quality management programs and to share and, as appropriate, develop manufacturing best practices.

SEC. 403.—COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENTS

This section amends section 202(d)(1) of the Stevenson-Wydler Act (as so redesignated by this bill) by allowing Federal laboratories to contribute both real and personal property to research projects under cooperative research and development agreements.

SEC. 404.—CLEARINGHOUSE ON STATE AND LOCAL INITIATIVES

This section amends section 102(a) of the Stevenson-Wydler Act (as so redesignated by the reported bill) by moving DOC's Clearinghouse on State and Local Initiatives on Productivity, Technology, and Innovation from the Office of Productivity, Technology, and Innovation (now the DOC Office of Technology Policy) to NIST.

SEC. 405.—USE OF DOMESTIC PRODUCTS

Subsection (a) states that a person shall not intentionally affix a label bearing the inscription of "Made in America," or any inscription with that meaning, to any product sold in or shipped to the United States, if that product is not a domestic product. A person who violates this prohibition shall not be eligible for any contract for a procurement carried out with amounts authorized under this legislation and the amendments made by this legislation, including any subcontract under such a contract pursuant to the debarment, suspension, and ineligibility procedures in subpart 9.4 of chapter 1 of title 48, Code of Federal Regulations, or any successor procedures thereto.

Subsection (b) states that the head of each agency which conducts procurements shall ensure that such procurements are conducted in compliance with sections 2 through 4 of the Act of March 3, 1933 (41 U.S.C. 10a through 10c, popularly known as the "Buy American Act"). This subsection shall apply only to procurements made for which amounts are authorized by this legislation and the amendments made by this legislation, to be made available; and solicitations for bids are issued after the date of enactment of this legislation. The Secretary, before January 1, 1994, shall report to Congress on procurements covered under this subsection of products that are not domestic products.

Subsection (c) provides a definition of the term "domestic product."

SEC. 406.—SEVERABILITY

This section provides that if any provision of this legislation, or the application thereof to any person or circumstance, is held invalid, the remainder of this legislation and the application thereof to other persons or circumstances shall not be affected thereby.

SEC. 407.—WIND ENGINEERING RESEARCH PROGRAM

Subsection (a) provides that this section may be cited as the "Wind Engineering Program Act of 1993."

Subsection (b) states that Congress finds and declares the following:

(1) Hurricanes and tornadoes kill more Americans and destroy more property than any other natural disaster.

(2) Each year, in the United States, extreme winds cause billions of dollars of damage to homes, schools, and other buildings, roads and bridges, electrical power distribution networks, and communications networks.

(3) Research on wind and wind engineering has resulted in improved methods for making buildings and other structures less vulnerable to extreme winds, but additional research funding is needed to develop new, improved, and more cost-effective methods of wind-resistant construction.

(4) Federal funding for wind engineering research has decreased drastically over the last 20 years.

(5) Wind research has been hampered by a lack of data on near-surface wind speed and distribution during hurricanes, tornadoes, and other severe storms.

(6) Many existing methods for wind-resistant construction are inexpensive and easy to implement but often they are not applied because the construction industry and the general public are unaware of such methods.

(7) Various Federal agencies have important roles to play in wind engineering research, but at present there is little interagency cooperation in this area.

(8) Establishment of a Federal Wind Engineering Program would result in new technologies for wind-resistant construction, broader application of such technologies in construction, and ultimately decreased loss of life and property due to extreme winds.

Subsection (c) states that the purpose of this section is to create a Wind Engineering Program within NIST, which would—

(1) provide for wind engineering research;

(2) serve as a clearinghouse for information on wind engineering; and

(3) improve interagency coordination on wind engineering research between NIST, the National Oceanic and Atmospheric Administration (NOAA) NSF, the Federal Aviation Administration (FAA), and other appropriate agencies.

Subsection (d) states that within NIST there shall be established a Wind Engineering program which shall—

(1) conduct research and development, in cooperation with the private sector and academia, on new methods for mitigating wind damage due to tornadoes, hurricanes, and other severe storms;

(2) fund construction and maintenance of wind tunnels and other research facilities needed for wind engineering research;

(3) promote the application of existing methods for, and research results on, reducing wind damage to buildings that are usually incompletely or nonengineered, such as single-family dwellings, mobile homes, light industrial buildings. and small commercial structures;

(4) transfer technology developed in wind engineering research to the private sector so that it may be applied in building codes, design practice, and construction;

(5) conduct, in conjunction with NOAA postdisaster research following hurricanes, tornadoes, and other severe storms to evaluate the vulnerability of different types of buildings to extreme winds;

(6) serve as a point of contract for dissemination of research information on wind engineering and work with the private sector to develop education and training programs on construction techniques, developed from research results, for reducing wind damage;

(7) work the NOAA, the FAA, and other agencies as is appropriate, on meteorology programs to collect and disseminate more data on extreme wind events; and

(8) work with NSF to support and expand basic research on wind engineering.

TITLE V.—AUTHORIZATIONS OF APPROPRIATIONS

SEC. 501.—TECHNOLOGY ADMINISTRATION

Subsection (a) states that there are authorized to be appropriated to the Secretary, to carry out the activities of the Under Secretary and the Assistant Secretary of Commerce for Technology Policy—

(1) for the Office of the Under Secretary, $5,000,000 for FY 1994 and $8,000,000 for FY 1995;

(2) for Technology Policy, $5,000,000 for FY 1994 and $6,000,000 for FY 1995;

(3) for Japanese Technical Literature, $2,000,000 for FY 1994 and $3,000,000 for FY 1995;

(4) for the Office of Technology Monitoring and Competitiveness Assessment, $3,000,000 for FY 1994 and $5,000,000 for FY 1995.

Subsection (b) states that funds may be transferred among the line item listed in subsection (a), so long as the net funds transferred to or from any line item do not exceed 10 percent of the amount authorized for that line item in such subsection; the aggregate amount authorized under subsection (a) is not changed; and the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives are notified in advance of any such transfer. In addition, the Secretary may propose transfers to or from any line item listed in subsection (a) exceeding 10 percent of the amount authorized from such line item, but such proposed transfer may not be made unless—

(A) a full and complete explanation of any such proposed transfer and the reason therefor are transmitted in writing to the Speaker of the House of Representatives, the President of the Senate, and the appropriate authorizing committees of the House of Representatives and the Senate; and

(B) 30 days have passed following the transmission of such written explanation.

Subsection (c) states that as part of its modernization effort and before signing a new facility lease, NTIS, in consultation with the

General Services Administration, shall study and report to Congress on the feasibility of accomplishing all or part of its modernization by signing a long-term lease with an organization that agrees to supply a facility and supply and periodically upgrade modern equipment which permits NTIS to receive, store, and manipulate in electronic form, and print, electronically created documents and reports and to carry out the other functions assigned to NTIS.

SEC. 502.—NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY

Subsection (a) states that there are authorized to be appropriated to the Secretary, to carry out the intramural scientific and technical research and services activities of NIST, $240,988,000 for FY 1994 and $320,764,000 for FY 1995. Of these amounts—

(A) $1,000,000 for FY 1994 and $1,000,000 for FY 1995 are authorized only for the evaluation of nonenergy-related inventions;

(B) $9,000,000 for FY 1994 and $10,000,000 for FY 1995 are authorized only for the technical competence fund; and

(C) $5,000,000 for FY 1994 and $5,000,000 for FY 1995 are authorized only for the standards pilot project established under section 104(e) of the American Technology Preeminence Act of 1991 (Public Law 102–245; 106 Stat. 10).

Subsection (b) states that in addition to the amounts authorized under subsection (a), there are authorized to the appropriated to the Secretary $105,000,000 for FY 1993, $62,000,000 for FY 1994, and $105,000,000 for FY 1995 for the renovation and upgrading of NIST's facilities. NIST may enter into a contract for the design work for such purposes only if Federal Government payments under the contract are limited to amounts provided in advance in appropriations Acts.

Subsection (c) states that in addition to the amounts authorized under subsections (a) and (b), there are authorized to be appropriated to the Secretary, to carry out the extramural industrial technology services activities of NIST—

(1) for the Manufacturing Extension Partnership, $120,000,000 for FY 1994 and $220,000,000 for FY 1995, of which—

(A) $40,000,000 for FY 1994 and $60,000,000 for FY 1995 are authorized only for the support of MTCs;

(B) $30,000,000 for FY 1994 and $80,000,000 for FY 1995 are authorized only for the support of MOCs;

(C) $30,000,000 for FY 1994 and $50,000,000 for FY 1995 are authorized only for the STEP;

(D) $20,000,000 for FY 1994 and $30,000,000 for FY 1995 are authorized only for the Institute activities in support of the MEP, including support of the technology extension communications network provided for, and the associated clearinghouse system developed, under section 304 of the Stevenson-Wydler Act as added by section 212 of (the reported bill);

(2) for the ATP, $200,00,000 for FY 1994 and $468,000,000 for FY 1995, of which $30,000,000 for FY 1994 and $50,000,000 for FY 1995 are authorized only for support of the Advanced

Manufacturing Technology Development Program established under section 303 of the Stevenson-Wydler Act (as added by section 212 of (the reported bill); and

(3) for quality programs at NIST, $2,000,000 for each of the fiscal years 1994 and 1995.

Subsection (d) states that there are authorized to be appropriated to NIST for the purposes of section 407 of this legislation (wind engineering), $1,000,000 for FY 1994 and $3,000,000 for FY 1995. Of these amounts, no less than 50 percent shall be used for cooperative agreements with NOAA, NSF, and the FAA, or other agencies, for wind engineering research, development of improved practices for structures, and the collection and dissemination of meteorological data needed for wind engineering.

SEC. 503.—ADDITIONAL ACTIVITIES OF THE TECHNOLOGY ADMINISTRATION

This section states that in addition to the amounts authorized under section 501 and 502, there are authorized to be appropriated to the Secretary—

(1) for the establishment and management of a technology training clearinghouse, $2,000,000 for FY 1994 and $3,000,000 for FY 1995;

(2) for the support of policy experiments relating to intelligent manufacturing systems, $10,000,000 for FY 1994; and

(3) for the purpose of carrying out the technology financing pilot program under section 305, $2,000,000 in FY 1994 to prepare the operating plan and promulgate regulations required under subsection (c) of that section and $50,000,000 for each of fiscal years 1995 and 1996 to carry out the provisions of that section.

Amounts appropriated under paragraph (3) shall remain available for expenditure through September 30, 1996. Of the amounts made available under paragraph (3) for a fiscal year, not more than $5,000,000 or 10 percent, whichever is greater, shall be available for administrative expenses. The Secretary, through the Under Secretary and the Director, may accept the transfer of funding appropriated to any other agency for purposes similar or related to those of the programs established and carried out under title III of the Stevenson-Wydler Act (as added by section 212 of this bill), or the programs established and carried out under sections 25 and 26 of the NIST Act (15 U.S.C. 278k and 278*l*), and to use those funds to implement such programs as provided in those statutory provisions.

Paragraph (2) is intended to authorize funds for the Secretary and the Under Secretary to support the participation of U.S. citizens in official multilateral forums regarding the international Intelligent Manufacturing Systems (IMS) Initiative. Major industrial countries have agreed to negotiate and carry out a series of IMS pilot projects, and the funds authorized are intended to enable officially designated Americans to travel to and participate in these forums. The authorization is not intended to provide Federal funds for any actual research that might be carried out under these pilot projects. Research funding is the responsibility of private U.S. companies and, as appropriate, regular Federal research programs.

SEC. 504.—NATIONAL SCIENCE FOUNDATION

This provision states that in addition to such other sums as may be authorized by other provisions of law to be appropriated to the Director of NSF, there are authorized to be appropriated to that Director, to carry out the provisions of section 221, $ 50,000,000 for FY 1994 and $75,000,000 for FY 1995.

SEC. 505.—AVAILABILITY OF APPROPRIATIONS

This section states that appropriations made under the authority provided in this title shall remain available for obligation, for expenditure, or for obligation and expenditure for periods specified in the Acts making such appropriations.

TITLE VI.—INFORMATION TECHNOLOGY APPLICATIONS RESEARCH PROGRAM

SEC. 601.—SHORT TITLE

This section states that this title may be cited as the "Information Technology Applications Program Act of 1993".

SEC. 602.—FINDINGS AND PURPOSE

Subsection (a) states that Congress finds and declares the following:

(1) High-performance computing and high-speed networks have proven to be powerful tools for improving America's national security, industrial competitiveness, and research capabilities.

(2) Federal programs, like the High-Performance Computing Program established by Congress in 1991, have played a key role in maintaining U.S. leadership in high-performance computing, especially in the defense and research sectors.

(3) High-performance computing and high-speed networking have the potential to revolutionize many fields, including education, libraries, health care, and manufacturing, if adequate resources are invested in development the technology needed to do so.

(4) The Federal Government should ensure that the technology developed under research and development programs like the High-Performance Computing Program can be widely applied for the benefit of all Americans, including Americans with disabilities.

(5) A coordinated, interagency program is needed to identify and promote the development of applications of high-performance computing and high-speed networking which will provide large economic and social benefits to the Nation. These so-called national challenges should include tools for teaching, digital libraries of electronic information, computer systems to improve the delivery of health care, and computer and networking technology to promote U.S. competitiveness. To the extent practicable, these applications should be designed and operated in a manner consistent with copyright law.

(6) OSTP is the appropriate office to coordinate such a program.

Subsectin (b) states that it is the purpose of this title to help ensure the widest possible application of high-performance computing and high-speed networking. This requires that the U.S. Government—

(1) expend Federal support for research and development on applications of high-performance computing and high-speed networks for—

(A) improving education at all levels, from preschool to adult education, by developing new educational technology;

(B) building digital libraries of electronic information accessible over computer networks like the National Research and Education Network (NREN);

(C) improving the provisions of health care by furnishing health care providers and their patients with better, more accurate, and more timely information; and

(D) increasing the productivity of the Nation's workers, especially in the manufacturing sector; and

(2) improve coordination of Federal efforts to deploy these technologies in cooperation with the private sector as part of an advanced, national information infrastructure.

SEC. 603.—INFORMATION TECHNOLOGY APPLICATIONS RESEARCH PROGRAM

This section states that the High-Performance Computing Act of 1991 (15 U.S.C. 5501 et seq.) is amended by adding at the end a new title III, entitled "Information Technology Applications Research Program." The new title has three sections.

New section 301 states that the OSTP Director, through the Federal Coordinating Council for Science, Engineering, and Technology (FCCSET), shall, in accordance with this title—

(1) establish a coordinated interagency applications research program to develop and demonstrate applications of computing and networking technology developed under the High-Performance Computing and Communications (HPCC) Program set forth in section 101, that are designed (A) to be accessible and usable by all persons in the United States, in the fields of education, libraries, health care, the provision of government information, and other appropriate fields; and (B) to ensure privacy, security, and respect for copyrights; and

(2) develop a Plan for Computing and Networking Applications (hereafter in this title referred to as the "Plan") describing the goals and proposed activities of the applications research program established under paragraph (1), taking into consideration the recommendations of the advisory committee on high-performance computing and applications established under section 101(b).

The President shall designate the Federal agencies and departments which shall participate in the applications program established under this section.

The Committee has explicitly added the word "research" into the title of the Information Technology Applications Research Program. The word "research" has been added to stress that title VI is authorizing a research program, not an effort to build a Government-subsidized computer network that would compete with private telecommunications companies for private-sector customers. The purpose of title VI is to authorize Federal agencies to support demonstration projects to help develop, test, and evaluate new applications of high-performance computing. Nothing is this title is intended to authorize Federal agencies to support or build entirely new classes of computer networks different from what they are now assisting.

The Committee directs that all agencies receiving authorizations under this title, to the maximum extent permitted by other law and regulations, shall award funds appropriated pursuant to these authorizations through competitive, merit-reviewed processes. To the maximum extent appropriate, these competitions shall be open to private companies as well as to other applicants.

In stating that the computing applications developed under this program should be designed to be accessible to and usable by all persons in the United States, the Committee intends that these federally aided applications be accessible to and usable by, among others, Americans with disabilities. This direction particularly applies to computing applications in education, health care, and digital libraries. Furthermore, to the extent practicable, the program should expand opportunities for the full participation of disabled Americans in society.

New section 302 deals with the Plan required under the previous section. Subsection (a) states that the Plan shall contain recommendations for a 5-year national effort and shall be submitted to the Congress within 1 year after the date of enactment of this title. The Plan shall be resubmitted upon revision at least once every 2 years thereafter.

New section 302(b) states that the Plan shall—

(1) establish the goals and priorities for the program for the fiscal year in which the Plan (or revised Plan) is submitted and the succeeding 4 fiscal years;

(2) set forth the role of each Federal Agency and Department in implementing the Plan;

(3) describe the levels of Federal funding for each Agency and Department, and specific activities, required to achieve the goals and priorities established under paragraph (1);

(4) identify steps agencies will take in the applications research program to promote privacy, security, and respect for copyrights in Federal networks and computing applications; and

(5) assign particular agencies primary responsibility for developing-particular national challenges of high-performance computing and high-speed networks.

In drafting this subsection, the Committee has placed a great emphasis on the importance of privacy, security, and respect for copyrights. Close attention must be paid to all three areas to ensure workable and credible computer networks. In the copyright area, for example, unless intellectual property protections are fully applied in the networking environment, from the time of its creation, incentives for publishers and others to place their property on networks will diminish over time, and the value of the information services will be diminished accordingly. The Committee believes that both developers and users of computer applications promoted by this title, from the outset, must be aware of the importance of copyright protections in the development and availability of created materials. It is intended that nothing in this legislation in any way alters or modifies title 17, U.S. Code, and that, to the degree consistent with existing law, copyright legislation applies fully to all of the activities authorized under this title. The Committee also notes that the publishing industry bears a responsibility to develop, in cooperation with Federal computer agencies and vendor firms, practical copyright management systems by which computer users can access copyrighted materials, use those materials, and readily pay any appropriate fees. It is also noted many digital library projects may involve material in which intellectual property issues are not a consideration. Examples include material which already has passed into the public domain, or Federal information or data in the public domain. The development of means for protecting copyrighted material should not delay experimental projects using such public domain information.

In general, it is intended that the activities set forth in the Plan will include basic and applied research activities related to the long-range social and ethical implications of applications of high-speed networking and high-performance computing.

New section 302(c) states that accompanying the Plan shall be—

(1) a summary of the achievements of Federal efforts during the preceding fiscal year to develop technologies needed for deployment and full utilization of an advanced information infrastructure;

(2) an evaluation of the progress made toward achieving the goals and objectives of the Plan;

(3) a summary of problems encountered in implementing the Plan; and

(4) any recommendations regarding additional action or legislation which may be required to assist in achieving the purposes of this title.

New section 302(d) states that the Plan shall address, where appropriate, the relevant programs and activities of the following Federal agencies and departments: NSF; DOC, particularly NIST, NOAA, and the National Telecommunications and Information Administration (NTIA); NASA; DOD, particularly ARPA; DOE; the Department of Health and Human Services (HHS), particularly its the National Institutes of Health (NIH) and the National Library of Medicine (NLM); the Department of the Interior (DOI), particularly the United States Geological Survey (USGS); the Department of Education; the Department of Agriculture, particularly the National Agricultural Library; and such other agencies and departments as the President or the Chairman of FCCSET considers appropriate.

New section 302(e) states that in addition, the Plan shall take into consideration the present and planned activities of the Library of Congress, as deemed appropriate by the Librarian of Congress.

New section 302(f) states the FCCSET shall serve as lead entity responsible for development of the Plan and interagency coordination of the Program; coordinate the high-performance computing research and development activities of Federal agencies and departments undertaken pursuant to the Plan and report at least annually to the President, through the Chairman of FCCSET, on any recommended changes in agency or departmental roles that are needed to better implement the Plan; review, prior to the President's submission to Congress of the annual budget estimate, each agency and departmental budget estimate in the context of the Plan and make the results of that review available to the appropriate elements of the Executive Office of the President, particularly the Office of Management and Budget; and consult and ensure communication between Federal agencies and research, educational, and industry groups and State agencies conducting research and development on and using high-performance computing.

New section 303 contains definitions of the following terms: broadband; information infrastructures; Internet; and National Challenge.

SEC. 604.—NETWORK ACCESS

Subsection (a) states that in accordance with the Plan developed under the new section 301 of the High-Performance Computing Act, NSF and DOC shall foster the creation of local networks in communities which will connect institutions of higher education, elementary and secondary schools, libraries, and State and local governments to each other; and provide for connection of such local networks to the Internet. Such program shall include funding for the acquisition of required hardware and for the establishment of broadband connections to the Internet. In making awards under this subsection, NSF and, as appropriate, DOC shall ensure that not more than 75 percent of the cost of the project for which the award is made is provided under this section.

Subsection (b) states that the Plan shall include programs administered by NSF, DOC, and other appropriate Agencies and Departments to train teachers, students, librarians, and State and local government personnel in the use of computer networks and the Internet. Training programs for librarians shall be designed to provide skills and training materials needed by librarians to instruct the public in the use of hardware and software for accessing and using computer networks and the Internet.

Subsection (c) states that the OSTP Director shall, within 1 year after the date of enactment of this legislation, submit a report to Congress which shall include—

(1) findings of an examination of the extent to which the education and library communities and State and local government have access to the Internet, including the numbers and the geographic distribution, by type, of institutions having access;

(2) a statement of the extent to which broadband connections to the Internet exist for the education and library communities and State and local governments, including the numbers and the geographic distribution, by type, of institutions having access;

(3) an assessment of the factors limiting access by schools, libraries, and State and local governments to the Internet and an estimate of the cost of providing universal broadband access for those institutions to the Internet; and

(4) recommendations for collaborative programs among Federal, State, and local governments and the private sector to expand connectivity to the Internet for educational institutions, libraries, and State and local governments.

Subsection (d) provides that there are authorized to be appropriated to NSF for the purposes of this section, $10,000,000 for FY 1994 and $25,000,000 for FY 1995.

The Committee is aware that many communities across the Nation have independently initiated networking efforts consistent with this title's goals of improving the access to all citizens to the benefits of high-performance computing. Working with these communities would be a cost-effective and timely method for getting maximum leverage from Federal investments. The Committee therefore intends that NSF and DOC, in making awards under this section, give careful consideration and, as appropriate, priority consideration to those communities which already have undertaken such efforts. Examples of relevant networking activity should include establishment of interconnectivity among elementary and secondary schools, other educational institutions, State and local governments, and assistance in providing access for these entities to the Internet.

SEC. 605.—APPLICATIONS FOR EDUCATION

Subsection (a) states that in accordance with the Plan developed under the new section 301 of the High-Performance Computing Act, NSF, DOC, and other appropriate agencies shall provide for the development of advanced computing and networking technology for use in education at all levels. Such applications shall include but not be limited to the following:

(1) pilot projects, including support for acquisition of required computer hardware and software, that demonstrate the educational value of the Internet in providing for advances in distance learning and electronic classrooms, facilitating nationwide communication among educators and students, access to databases of information in digital format, and access to innovative curricular materials;

(2) development, testing, and evaluation of computer systems, computer software, and computer networks for teacher training; and informal education outside of school, including workforce training in mathematics, science, and technology and in specific job-related skills; and

(3) development, testing and evaluation of advanced educational software and of network-based information resources, including software and information resources to assist students with disabilities.

Subsection (b) states that in carrying out activities under subsection (a), NSF, DOC, and other appropriate agencies shall work with the computer and communications industry, authors and publishers of educational materials, State education departments, local school districts, and the Department of Education, as appropriate.

Subsection (c) states that the Administrator of NASA shall establish a Computer Technologies for K–12 Education Project to test and demonstrate educational applications of advanced computer technologies in K–12 public school systems. The Project shall award, on a competitive basis, grants to plan, deploy, manage, and operate advanced educational applications of computer technologies in K–12 public school systems in the U.S. in response to proposals requested by the NASA Administrator. Such proposals, at a minimum, shall provide for—

(1) placement and use of advanced computer hardware, software, and networking capabilities to benefit as broad a segment of the relevant public school system as possible;

(2) use of computer technology to provide audio-visual and interactive educational experiences for students and teachers;

(3) incorporation of computer technology in as many phases of the school system curricula as practicable and across all grade levels;

(4) connection of the school system to national, regional, and local computer networks which would enhance the educational capability and effectiveness of the system;

(5) access to national, regional, and local libraries and databases which would improve the educational process and enhance the educational experience within the school system; and

(6) matching non-Federal funds committed to support the proposal amounting to not less than 30 percent of the Federal grant from the Project.

Subsection (d) states that there are authorized to be appropriated to NSF for the purposes of subsections (a) and (b) $12,000,000 for FY 1993, $24,000,000 for FY 1994, and $40,000,000 for FY 1995. There are authorized to be appropriated to NASA $8,000,000 for each of the fiscal years 1994 and 1995, to carry out the provisions of subsection (c). No funds shall be awarded under the Project other than through the competitive process established by the Administrator pursuant to this section.

The Committee notes that local governments, and associations of local governments, are potentially major users of new computer applications, and therefore Federal agencies should consider them in this capacity as potential partners in demonstration projects to develop new computing applications in education and in the other areas addressed in this title. Federal agencies should consider sponsoring local government computing applications demonstration projects which are consistent with the Plan set forth under the new section 301 and new section 101(a)(2)(J) of the High-Performance Computing Act.

SEC. 606.—APPLICATIONS FOR MANUFACTURING

Subsection (a) states in accordance with the plan developed under the new section 301 of the High-Performance Computing Act, NIST, shall, as provided under section 303 of the Stevenson-Wydler Act (as added by section 212 of the reported bill), establish an Advanced Manufacturing Technology Development Program, including advanced manufacturing systems and networking projects. Activities under the Advanced Manufacturing Technology Development Program shall, as appropriate, be coordinated with the activities of ARPA, NSF, other Federal agencies, and the States to develop, refine, test, and transfer advanced computer-integrated electronically networked manufacturing technologies and associated applications.

Subsection (b) states that the NIST Director may request and accept funds, facilities, equipment, or personnel from other Federal Departments and Agencies in order to carry out responsibilities under this section.

Subsection (c) states that of the amounts authorized under section 502(a) for NIST's intramural scientific and technical research and services, $24,000,000 for FY 1994 and $40,000,000 for FY 1995 are authorized only for activities under this section.

SEC. 607.—APPLICATIONS FOR HEALTH CARE

Subsection (a) states that in accordance with the Plan developed under the new section 301 of the High Performance Computing Act of 1991, HHS, through NIH, NLM, and the Centers for Disease Control and Prevention, in cooperation with NSF and other appropriate agencies, shall develop and support the development of interoperable technologies for applications of high-performance computing and high-speed networking in the health care sector. In such development, emphasis shall be placed initially on applications that can produce significant savings in national health care costs. Such technologies shall, when feasible, build on existing Federal programs for developing information technology applications in the health care sector. Such applications shall include but not be limited to the following:

(1) test bed networks for linking hospitals, clinics, doctor's offices, medical schools, medical libraries, and universities to enable health care providers and researchers to share medical data and imagery, including test bed projects involving rural providers and others;

(2) software and visualization technology for visualizing the human anatomy and analyzing imagery from x-rays, CAT scans, PET scans, and other diagnostic tools;

(3) virtual reality technology for simulating operations and other medical procedures;

(4) collaborative technology to allow several health care providers in remote locations to provide real-time treatment to patients;

(5) data base technology to provide health care providers with access to relevant medical information and literature;

(6) data base technology for storing, accessing, and transmitting patients' medical records while protecting the accuracy and privacy of those records; and

(7) development, testing, and evaluation of data base and network technologies for the storage of consumer-oriented, interactive, multimedia materials for health promotion, and for the distribution of such materials to public access points, such as community health and human service agencies, schools, and public libraries.

Subsection (b) states that there are authorized to be appropriated to NLM for the purposes of this section, $9,000,000 for FY 1993, $30,000,000 for FY 1994, and $50,000,000 for FY 1995.

SEC. 608.—APPLICATIONS FOR LIBRARIES

Subsection (a) states that in accordance with the Plan developed under the new section 301 of the High-Performance Computing Act, NSF, NASA, ARPA, and other appropriate agencies shall develop technologies for "digital libraries" of electronic information. Development of digital libraries shall include the following:

(1) development of advanced data storage systems capable of storing hundreds of trillions of bits of data and giving thousands of users nearly instantaneous access to that information;

(2) development of high-speed, highly accurate systems for converting printed text, page images, graphics, and photographic images into electronic form;

(3) development of data base software capable of quickly searching, filtering, and summarizing large volumes of text, imagery, data, and sound;

(4) encouragement of development and adoption of common standards and, where appropriate, common formats, for electronic data;

(5) development of computer technology to categorize and organize electronic information in a variety of formats;

(6) Training of data base users and librarians in the use of and development of electronic data bases;

(7) development of technology for simplifying the utilization of networked data bases distributed around the Nation and around the world; and

(8) development of visualization technology for quickly browsing large volumes of imagery.

Subsection (b) states that NSF, working with the supercomputer centers it supports, shall develop prototype digital libraries of scientific data available over the Internet.

Subsection (c) states that NSF, in consultation with the Department of Education, DOC, ARPA, and the Library of Congress, is authorized to initiate a competitive, merit-based program to support the efforts of States and, as appropriate, libraries to develop electronic libraries. These electronic libraries shall provide delivery of and access to a variety of data bases, computer programs and interactive multimedia presentations, including educational materials, research information, statistics and reports developed by Federal, State, and local governments, and other information and informational services which can be carried over the Internet.

The purpose behind subsection (c) is to provide for the creation of a system of State-based electronic libraries which will serve three functions: to provide delivery of or access to a vast array of interactive, multimedia educational programs, research and informational data and services, and networking opportunities; to seek to make these materials available to all Americans through public libraries, electronic data bases, and telecommunications systems such as the Internet or other publicly available networks, which reach into the home, school, and community; and to provide robust and reliable computer program support services for search and retrieval, including, but not limited to, tools for intelligent querying, aids in formulating search strategies, indexes and inventories of available resources, and mechanisms to guide the user, and which make provision for education and training programs in the use of the electronic library resources. In order to qualify for a grant under this subsection, a State should: establish a statewide committee; have that committee develop a statewide plan for a network-accessible electronic library and for widespread access to such library, including access from the home and school; commit to participate with NSF-designed coordination mechanisms as necessary to ensure efficient interoperability with other State systems; and provide matching funds, in cash or in kind, from State and private sources equal to at least 30 percent of the total grant cost.

Subsection (d) states that NASA shall develop databases of software and remote-sensing images to be made available over computer networks like the Internet.

Subsection (e) states that there are authorized to be appropriated to NSF for the purposes of this section, $10,000,000 for FY 1993, $30,000,000 for FY 1994, and $55,000,000 for FY 1995. There are authorized to be appropriated to NASA for the purposes of this section, $10,000,000 for FY 1993, $20,000,000 for FY 1994, and $30,000,000 for FY 1995.

SEC. 609.—APPLICATIONS FOR GOVERNMENT INFORMATION

Subsection (a) states that in accordance with the Plan developed under the new section 301 of the High-Performance Computing Act, the Secretary of DOC and, as appropriate, other Federal officials shall identify projects to develop and apply high-performance computing and high-speed networking technologies to provide improved public access to information generated by Federal, State, and local governments.

Subsection (b) states that in accordance with subsection (a), projects shall be undertaken which—

(1) connect depository libraries and other sources of government information to the Internet to enable—

(A) access to Federal Government information and data bases in electronic formats;

(B) access to State or local government information;

(C) access to related resources which enhance the use of government information; and

(D) linkages with other libraries and institutions to enhance use of government information; and

(2) demonstrate, test, and evaluate technologies to increase access to and facilitate effective use of government information and data bases for support of research and education, economic development, and an informed citizenry.

Subsection (c) states that in accordance with subsection (a), an information locator system shall be established which is accessible by the public via the Internet and which provides citations to Federal information and guidance on how to obtain such information.

Subsection (d) states that in accordance with the Plan developed under the new section 301 of the High-Performance Computing Act, NOAA and other appropriate agencies shall provide for the development and application of high-performance computing and high-speed networking technology for use in environmental monitoring, prediction, and assessment, including making environmental data and information more readily accessible. Such applications shall include but not be limited to the following:

(1) development of advanced data acquisition systems for in situ and remotely sensed environmental data that are capable of making these data available to thousands of users;

(2) development of advanced information systems to process these environmental data, including necessary quality control and interpretation using the most current scientific knowledge, so that the resulting environmental information is reliable, useful, and distributed widely over computer networks such as the National Research and Education Network in a timely manner; and

(3) development of advanced information systems to archive and disseminate this environmental data and information so that it can be readily used for environmental policymaking, research, and operational purposes.

Subsection (e) states that there are authorized to be appropriated to the Secretary of DOC for the purposes of this section, $14,000,000 for FY 1994 and $36,000,000 for FY 1995.

SEC. 610.—HIGH-PERFORMANCE COMPUTING AND APPLICATIONS ADVISORY COMMITTEE

This section amends section 101(b) of the High-Performance Computing Act of 1991 (15 U.S.C. 5511(b)) to state that the OSTP Director shall establish an advisory committee on high-performance computing and applications consisting of non-Federal members, including representatives of the research, elementary and secondary education, higher education, and library communities, consumer and public interest groups, network providers, and the computer, telecommunications, and information and publishing industries, who are specially qualified to provide the Director with advice and information on high-performance computing and on applications of computing and networking. The recommendations of the advisory committee shall be considered in reviewing and revising the program, and the Plan required by section 301(2). The advisory committee shall provide the Director with an independent assessment of—

(1) progress in implementing the program and the Plan;

(2) the need to revise the program and the Plan;

(3) the balance between the components of the activities undertaken pursuant to the High-Performance Computing Act of 1991;

(4) whether the research, development, and demonstration projects undertaken pursuant to the High-Performance Computing Act of 1991 are helping to maintain U.S. leadership in computing and networking technologies and in the application of those technologies;

(5) whether the applications developed under title III of the High-Performance Computing Act of 1991 are successfully addressing the needs of the targeted populations, including assessment of the number of users served by those applications; and

(6) other issues identified by the OSTP Director.

SEC. 611.—NATIONAL RESEARCH AND EDUCATION NETWORK AMENDMENTS

This section amends section 102(a) of the High-Performance Computing Act of 1991 (15 U.S.C. 5512) to say that as part of the Program described in section 101, NSF, DOD, DOE, DOC, NASA, and other agencies participating in the Program shall support the establishment of the NREN Program. The NREN Program shall consist of the following components:

(1) research and development of broadband networking software and hardware;

(2) experimental test bed networks for developing and demonstrating advanced networking technologies resulting from the activities described in paragraph (1), and for providing connections for purposes consistent with the High-Performance Computing Act of 1991 which require levels of network capabilities not available from commercial networks operated by the private sector; and

(3) provision of support directly to researchers, educators, and students to obtain access to and use of the Internet to allow for communication with other individuals in the research and education communities and to allow for access to high-performance computing systems, electronic information resources, other research facilities,and libraries.

New section 102(b) states that the test bed networks shall—

(1) be developed and deployed in coordination with the computer, telecommunications, and information industries;

(2) be designed, developed, and operated in collaboration with potential users in government, industry, and research institutions and educational institutions;

(3) be designed, developed, and operated in a manner which fosters and maintains competition and private sector investment in high-speed data networking within the telecommunications industry;

(4) be designed and operated in a manner which promotes and encourages research and development leading to the creation of commercial data transmission standards, enabling the establishment of privately developed high-speed commercial networks;

(5) support enough sites, users, and applications to provide a realistic test of new networking technologies;

(6) be designed and operated so as to enable the application of laws that provide network and information resources security, including those that protect copyright and other intellectual property rights, and those that control access to data bases and protect national security;

(7) have accounting mechanisms which allow users or groups of users to be charged for their usage of copyrighted materials available over the test bed networks and, where appropriate and technically feasible, for their usage of the test bed networks;

(8) be connected to and interoperable with Federal and non-Federal computer networks, to the extent appropriate, in a way that allows autonomy for each component network; and

(9) be developed by purchasing standard commercial transmission and network services from vendors whenever feasible, and by contracting for customized services when not feasible, in order to minimize Federal investment in network hardware.

New section 102(c) states that the Federal agencies and departments participating in activities under this section shall develop a plan with specific goals for implementing the requirements of new subsection (a)(3), including provision for financial assistance to educational institutions, public libraries, and other appropriate entities. This plan shall be submitted to the Congress not later than 1 year after the date of enactment of the Information Technology Application Program Act of 1993.

New section 102(d) states that the test bed networks shall not be used to provide commercial network services that are not related to experimental activity conducted under this section and that could otherwise be provided satisfactorily by using commercially available network services. This new subsection shall take effect 18 months after the date of enactment of this legislation.

It is intended that the determination of satisfactory availability shall include consideration of geographic access to and affordability of service, and timeliness and technical performance standards in providing services.

New section 102(e) states that as part of the HPCC Program, DOD, through ARPA, shall support research and development of advanced fiber optics technology, switches, and protocols needed to develop the Network Program.

New section 102(f) states that the OSTP Director shall assist the President in coordinating the activities of appropriate agencies and departments to promote the development of information services that could be provided over the Internet consistent with the purposes of this Act. These services may include the provision of directories of the users and services on computer networks, data bases of unclassified Federal scientific data, training of users of data bases and computer networks, and technology to support computer-based collaboration that allows researchers and educators around the Nation to share information and instrumentation.

New section 102(g) states that all Federal agencies and departments are authorized to allow recipients of Federal research grants to use grant moneys to pay for computer networking expenses.

SEC. 612.—CONFORMING AMENDMENTS

This section states that the High-Performance Computing Act is amended—

(1) in section 3(l), by amending subparagraph (A) to read as: "(A) accelerate the creation of a universally accessible broadband telecommunications network for the Nation;";

(2) in section 4(4), by inserting immediately before the semicolon the following: ", which consists of that portion of the Internet which receives direct Federal subsidy;"; and

(3) in section 101(a)(2), by adding at the end a new subparagraph (J) which states that HPCC program shall not provide for the building, ownership, or operation of data communications networks by the Federal Government, or any State or local government, or any agency or instrumentality thereof, un-

less such networks are either (i) test bed networks or (ii) networks operated for government mission purposes, including military purposes.

The Committee has added new subparagraph (J) to make clear its intent that Federal HPCC funds not be used to support the building, ownership, or operation of government data networks that would be used for non-government purposes. The Committee believes strongly that Federal money should not be used to subsidize Government networks which compete with private telecommunications systems for private-sector, commercial business and customers. At the same time, however, the Committee intends that HPCC funds may continue to be used for two longstanding purposes: research test beds and the mission purposes of Government agencies. (To ensue that research test bed networks are not abused and used as subsidized competitors of private networks for commercial customers, the legislation also includes the limitations on test bed networks set forth above in the revised section 102(d) of the High-Performance Computing Act.)

It is important to stress that current networking activities conducted for Government mission purposes would not be prohibited under the new subparagraph (J) from receiving funds from the Federal HPCC Program or other Federal programs. For example, a number of State public television organizations currently work with the Public Broadcasting System (PBS) to operate a computer network known as Learning Link. This network delivers suggested lesson plans and science and mathematics information to teachers and students who use PBS television programs in their classroom. Since public education is clearly a State and local government mission, and also because PBS and public television in general receive Federal funds to carry out what the Federal Government considers one of its missions, subparagraph (J) would not prohibit Federal agencies from using HPCC funds to support all or part of Learning Link. In such case, however, it would not be appropriate for such an organization to provide commercial services—that is, services to commercial users—on the network for which it received HPCC funds.

ADDITIONAL VIEWS OF SENATOR LARRY PRESSLER

The dissolution of the Soviet Union and the end of the Cold War have shifted America's next battleground to the global markeplace. Today the challenge for the United States is to compete more effectively, particularly in lucrative high-tech industries such as advanced manufacturing and high-performance computing. The reported version of S. 4 is a legitimate effort to meet this challenge by authorizing $2.3 billion over two years to expand the efforts of the Department of Commerce's National Institute of Standards and Technology (NIST) to place advanced manufacturing technologies into the hands of small- and medium-sized businesses and to support research and development (R&D) in commercially relevant critical technologies.

Two of these programs marked for expansion in the bill—the Manufacturing Technology Centers (MTCs) and the Advanced Technology Program—have shown considerable promise since their establishment in the Omnibus Trade and Competitiveness Act of 1988. MTCs provide needed technical assistance to small- and medium-sized businesses seeking to improve or modernize their plants. Similarly, the Advanced Technology Program awards peer-reviewed grants to private firms to develop generic, precommerical R&D to help accelerate the commercialization of inventions and technical advances.

Another reason I support S. 4 is Title VI of the bill, which is similar to legislation I cosponsored with Vice President Gore last year. Specifically, Title VI would authorize a multiagency program to develop advanced computer applications in health care, manufacturing, education (particularly in the K–12 school systems), and libraries. The program would follow up the existing High-Performance Computing and Communications Program which is aimed at creating an information "superhighway" linking thousands of labs, schools, businesses, and homes.

Title VI could generate enormous benefits for rural States like my home State of South Dakota. Advanced computer applications and networking could enhance our lives in countless ways. For instance, elementary school students in remote areas could obtain on-line computer access to the Library of Congress, university libraries, and other libraries and data bases. Teachers could enrich their curricula with the latest audio-visual teaching aids and interactive tools. Small rural hospitals would be able to access medical information or consult with larger, better equipped institutions around the country. The program could spawn a dramatic growth in telecommuting, where employees save time and transportation costs by using a FAX, computer, and printer to work out of the home. Title VI is designed to ensure that these promising applications become reality during our lifetime.

Notwithstanding my general support for S. 4, I do have reservations about the loan and financing provisions in the bill as introduced. Originally, the bill called for two pilot programs to provide capital to high-tech R&D firms. The first pilot program would have provided $60 million over two years for the Department of Commerce to make loans to small- and medium-sized businesses. This provision was troubling because, of all government finance programs, direct loans are the least attractive option. The Small Business Administration (SBA) has had extensive experience with different financing mechanisms. As a longstanding member and the current Ranking Republican of the Senate Small Business Committee, I have followed the SBA's progress and studied the lessons it has learned.

The SBA recently just completed a two-year major overhaul of the Small Business Investment Company (SBIC) program. This program has been successful in providing venture capital for small businesses for more than 35 years. SBA Administrator Erskine Bowles estimates that these reforms will bring between $1.5 to $3.0 billion in new private capital for the SBIC program over the next two years.

One major reform implemented by the SBA was to find a method other than direct loans to provide companies much needed venture capital. Not only are direct government loans the most costly and most risk-involved government financing tool, but they often are inappropriate for long-term ventures requiring patient capital.

After extensive study, the SBA discovered that many SBICs would use government guaranteed funds to loan directly to private firms that often would not show a profit for a number of years, but SBICs would be held accountable to pay off their loans to the government during the intervening years. Since no group, public or private, can ever guarantee when or whether a particular product or piece of technology will be marketable and profitable, a number of SBICs were forced out of business while waiting for their investments to pay off.

Direct loans are expensive for the Federal Government. A taxpayer's dollar used in a direct loan program is much less productive than in other government finance programs. Direct loans involve a greater liability for the Federal Government simply because more Government money is at risk. Direct loans are simply an appropriate tool for venture capital government financing, especially for the kind of long-range projects encouraged by S. 4. I am pleased that the direct loan provision was not included in the version of S. 4 reported out of the Senate Commerce Committee.

The second pilot program would have created critical technology investment companies (CTICs) and provided $105 million over two years for loans to the CTICs. The CTICs would provide these funds to high-tech firms performing research, development, and commercialization of critical technologies. This second program was specifically modelled after the SBIC program managed by the SBA.

The SBIC program has had a long and successful history and serves as a sound model for venture capital programs worldwide. Since 1958, SBICs have provided more than $1.6 billion in venture capital to finance advanced technologies during their early years of development. These funds have leveraged an additional $7.1 billion from other private investment sources to promote advanced technology. Some examples of small technology companies that received SBIC assistance include Cray Research, Apple Computer, Compaq Computer, Symbol Technologies, Inc., Data Race, Inc., Citation Computer Systems, Vmark Software, Xyplex, Inc., American Medical Electronics, and Intel.

As reported out of this committee, S. 4 contains compromise language which would authorize the Secretary of Commerce, in consultation with the Administrator of the SBA, to establish a pilot program to license and fund CTICs. The CTICs would provide loans and venture capital to technology firms, much like SBICs at the SBA. The compromise language also states that CTICs should place particular emphasis on firms whose net worth is $50 million or less. The bill also would require that each CTIC demonstrate to the Secretary of Commerce voluntary procedures to ensure investments are being provided to those firms that cannot receive financing solely through private capital markets. This language was placed in the legislation to address my concern that the CTIC program would be using taxpayer dollars to finance firms that could otherwise obtain capital from private sources.

This compromise language is a step forward and I supported its inclusion in S. 4 in the interest of cooperating with all concerned to help move this important legislation out of the Commerce Committee. S. 4 has positive points, and the bill should not be held back in committee because of CTICs alone. I applaud the efforts of Chairman Hollings and other Senators who have worked diligently on this legislation.

However, I remain concerned about the prospect of the Federal Government creating a duplicate bureaucracy at the Department of Commerce to administer a new program that largely exists already and is operating successfully in another Government agency, especially while we in Congress are working to reduce the size of the Federal Government and the Federal deficit.

Again, I commend Chairman Hollings, the members of the Committee, and their staffs for their leadership, cooperation, and patience in crafting the reported version of S. 4. There is much in this legislation to support. Nevertheless, when the bill is considered by the full Senate, I intend to seek further improvements in the legislation, particularly with regard to the financing provisions in the bill.

CHANGES IN EXISTING LAW

In compliance with paragraph 12 of rule XXVI of the Standing Rules of the Senate, changes in existing law made by the bill, as reported, are shown as follows (existing law proposed to be omitted is enclosed in black brackets, new material is printed in italic, existing law in which no change is proposed is shown in roman):

STEVENSON-WYDLER TECHNOLOGY INNOVATION ACT OF 1980

Section 2 and Following Sections

SEC. 2. FINDINGS.

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SEC. 3. PURPOSE.

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SEC. 4. DEFINITIONS.

As used in this Act unless the context otherwise requires, the term—

(1) "Office" means the Office of Technology Policy established under [section 5] *section 101* of this Act.

(2) "Secretary" means the Secretary of Commerce.

(3) "Under Secretary" means the Under Secretary of Commerce for Technology appointed under [section 5(b)(1)] *section 101(b)(1).*

(4) "Centers" means the Cooperative Research Centers established under [section 6] *section 102* or [section 8] *section 104* of this Act.

(5) "Nonprofit institution" means an organization owned and operated exclusively for scientific or educational purposes, no part of the net earnings of which inures to the benefit of any private shareholder or individual.

(6) "Federal laboratory" means any laboratory, any federally funded research and development center, or any center established under [section 6] *section 102* or [section 8] *section 104* of this Act that is owned, leased, or otherwise used by a Federal agency and funded by the Federal Government, whether operated by the Government or by a contractor.

(7) through (12) * * *

(13) "Clearinghouse" means the Clearinghouse for State and Local Initiatives on Productivity, Technology, and Innovation established by [section 6] *section 102.*

(14) "Director" means the Director of the National Institute of Standards and Technology.

(15) "Institute" means the National Institute of Standards and Technology.

(16) "Assistant Secretary" means the Assistant Secretary of Commerce for Technology Policy.

(17) "Advanced manufacturing technology" includes—

(A) numerically-controlled machine tools, robots, automated process control equipment, computerized flexible manufacturing systems, associated computer software, and other technology for improving manufacturing and industrial production which advance the state-of-the-art; and

(B) novel techniques and work organization processes designed to improve manufacturing quality, productivity, and practices, and to promote sustainable development, including engineering design, quality assurance, concurrent engineering, continuous process production technology, energy efficiency, waste minimization, design for recyclability or parts reuse, inventory management, upgraded worker skills, and communications with customers and suppliers.

(18) "Modern technology" means the best available proven technology, techniques, and processes appropriate to enhancing the productivity of manufacturers.

TITLE I—DEPARTMENT OF COMMERCE AND RELATED PROGRAMS

SEC. [5] *101.* COMMERCE AND TECHNOLOGICAL INNOVATION.

(a) through (b) * * *

(c) DUTIES.—The Secretary, through the Under Secretary, as appropriate, shall—

(1) through (13) * * *

(14) consider government measures with the potential of advancing United States technological innovation and exploiting innovations of foreign origin; [and]

(15) publish the results of studies and policy experiments[.]*; and*

(16) engage in joint projects with any person or persons on matters within the authority of the Department of Commerce, accept 'partnership fellows' and receive cash donations in the course of such joint projects, and in conjunction with the planning and operation of such joint projects hold meetings of matters of mutual interest with groups of interested persons without regard to any other provision of law, in order to protect sensitive information about United States industry and to assure industry participation in such joint projects.

(d) * * *

[(e) REPORT.—The Secretary shall prepare and submit to the President and Congress, within 3 years after the date of enactment of this Act, a report on the progress, findings, and conclusions of activities conducted pursuant to sections 5, 6, 8, 11, 12, and 13 of this Act (as then in effect) and recommendations for possible modifications thereof.]

(e) OFFICE OF TECHNOLOGY MONITORING AND COMPETITIVENESS ASSESSMENT.—(1) The Secretary, through the Under Secretary, shall establish within the Technology Administration an Office of

Technology Monitoring and Competitiveness Assessment, to collect, evaluate, assess, and disseminate information on—

(A) foreign science and technology, specifically information assessing foreign capabilities relative to the United States;

(B) policies and programs used by foreign governments and industries to develop and apply economically important critical technologies, how these policies and programs compare with public and private activities in the United States, and the effects that these foreign policies and programs have on the competitiveness of United States industry; and

(C) the way in which the economic competitiveness of United States industry can be enhanced through Federal programs, including Department of Commerce programs, and evaluations of the effectiveness of Federal technology programs in helping to promote United States industrial competitiveness and economic growth.

(2) Based on the information gathered under paragraph (1), the President, with the assistance of the Secretary, shall submit to Congress an annual report on United States technology and competitiveness analyzing the condition of United States technology relative to major trading partners, key trends in foreign technology and competitiveness policies and targeting, and the degree to which Federal programs are helping the United States to stay competitive with other countries and create domestic employment opportunities.

(3) The Office of Technology Monitoring and Competitiveness Assessment, in cooperation with the National Technical Information Service, is authorized to—

(A) act as a focal point within the Federal Government for the collection and dissemination, including electronic dissemination, of information on foreign process and product technologies, including information collected under the Japanese Technical Literature Program;

(B) work and, as appropriate, enter into cooperative arrangements with sector-specific industry trade associations or consortia to define the information desired by industry;

(C) compile and make available the extensive foreign technology monitoring and assessment information already collected and analyzed by the Federal Government;

(D) as appropriate, enter into controlled access agreements with other Federal Agencies to fill the industry's information needs;

(E) act as an electronic clearinghouse for this information or otherwise provide for this function;

(F) direct and fund the collection of additional information;

(G) direct and fund analysis of foreign research and development activities, technical capabilities, workplace practices, particularly in technical areas where the United States is considered to be at par or lagging foreign capabilities;

(H) establish a program to identify technical areas needing a full-scale technical evaluation, and provide, on a cost-shared basis to private sector or government-industry joint ventures, grants to conduct the evaluation;

(I) establish and administer a fellowship program to support Technology Fellows in those countries that are major competi-

tors of the United States in critical technologies to collect and provide initial analysis of information on foreign science and technology capabilities; and

(J) work with the Department of State to place technical experts from the Institute and other Federal laboratories into United States embassies to serve as technology attaches and counselors.

SEC. [6] *102*. CLEARINGHOUSE FOR STATE AND LOCAL INITIATIVES ON PRODUCTIVITY, TECHNOLOGY, AND INNOVATION.

(a) ESTABLISHMENT.—There is established within the [Office of Productivity, Technology, and Innovation] *Institute* a Clearinghouse for State and Local Initiatives on Productivity, Technology, and Innovation. The Clearinghouse shall serve as a central repository of information on initiatives by State and local governments to enhance the competitiveness of American business through the stimulation of productivity, technology, and innovation and Federal efforts to assist State and local governments to enhance competitiveness.

(b) through (d) * * *

SEC. [7] *103*. COOPERATIVE RESEARCH CENTERS.

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SEC. [8] *104*. GRANTS AND COOPERATIVE AGREEMENTS.

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SEC. [9] *105*. NATIONAL SCIENCE FOUNDATION COOPERATIVE RESEARCH CENTERS.

(a) ESTABLISHMENT AND PROVISIONS.—The National Science Foundation shall provide assistance for the establishment of Cooperative Research Centers. Such Centers shall be affiliated with a university, or other nonprofit institution, or a group thereof. The objective of the Centers is to enhance technological innovation as provided in [section 6(a)] *section 102(a)* through the conduct of activities as provided in [section 6(b)] *section 102(b)*.

(b) PLANNING GRANTS.—The National Science Foundation is authorized to make available nonrenewable planning grants to universities or nonprofit institutions for the purpose of developing the plan, as described under [section 6(c)(3)] *section 102(c)(3)*.

(c) * * *

SEC. [10] *106*. ADMINISTRATIVE ARRANGEMENTS.

(a) through (c) * * *

(d) COOPERATIVE EFFORTS.—The Secretary and the National Science Foundation shall, on a continuing basis, provide each other the opportunity to comment on any proposed program of activity under section [7, 9, 11, 15, 17, or 20] *103, 105, 108, 111, 201 or 205* of this Act before funds are committed to such program in order to mount complementary efforts and avoid duplication.

SEC. [16] *107*. NATIONAL TECHNOLOGY MEDAL.

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SEC. [17] *108*. MALCOLM BALDRIGE NATIONAL QUALITY AWARD.

(a) through (b) * * *

(c) CATEGORIES IN WHICH AWARD MAY BE GIVEN.—(1) Subject to paragraph (2), separate awards shall be made to qualifying organizations in each of the following categories—

(A) Small businesses.
(B) Companies or their subsidiaries.
(C) Companies which primarily provide services.
(D) Educational institutions.

(2) * * *

[(3) Not more than two awards may be made within any subcategory in any year (and no award shall be made within any category or subcategory if there are no qualifying enterprises in that category or subcategory).]

(3) No award shall be made within any category or subcategory if there are no qualifying enterprises in that category or subcategory.

(d) through (f) * * *

[(g) REPORT.—The Secretary shall prepare and submit to the President and the Congress, within 3 years after the date of the enactment of this section, a report on the progress, findings, and conclusions of activities conducted pursuant to this section along with recommendations for possible modifications thereof.]

(g) QUALITY LABORATORY.—A National Quality Laboratory is established within the Institute, the purpose of which is to perform research and outreach activities to assist private sector quality efforts and to serve as a mechanism by which United States companies, universities, and the Institute can work together to advance quality management programs and to share and, as appropriate, develop manufacturing best practices.

SEC. [18] *109.* CONFERENCE ON ADVANCED AUTOMOTIVE TECHNOLOGIES.

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SEC. [19] *110.* ADVANCED MOTOR VEHICLE RESEARCH AWARD.

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SEC. [20] *111.* PERSONNEL EXCHANGES.

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[SEC. 21. AUTHORIZATION OF APPROPRIATIONS.

[(a)(1) There is authorized to be appropriated to the Secretary for the purposes of carrying out sections 5, 11(g), and 16 of this Act not to exceed $3,400,000 for the fiscal year ending September 30, 1988.

[(2) Of the amount authorized under paragraph (1) of this subsection, $2,400,000 is authorized only for the Office of Productivity, Technology, and Innovation; $500,000 is authorized only for the purpose of carrying out the requirements of the Japanese technical literature program established under section 5(d) of this Act, and $500,000 is authorized only for the patent licensing activities of the National Technical Information Service.

[(b) In addition to the authorization of appropriations provided under subsection (a) of this section, there is authorized to be appropriated to the Secretary for the purposes of carrying out section 6 of this Act not to exceed $500,000 for the fiscal year ending September 30, 1988, $1,000,000 for the fiscal year ending September

30, 1989, and $1,500,000 for the fiscal year ending September 30, 1990.

[(c) Such sums as may be appropriated under subsections (a) and (b) shall remain available until expended.

[(d) To enable the National Science Foundation to carry out its powers and duties under this Act only such sums may be appropriated as the Congress may authorize by law.]

SEC. [22] *112*. SPENDING AUTHORITY.

No payments shall be made or contracts shall be entered into pursuant to the provisions of this Act (other than [sections 11, 12, and 13] *sections 201, 202, and 203*) except to such extent or in such amounts as are provided in advance in appropriations Acts.

SEC. 113. COMMERCE TECHNOLOGY ADVISORY BOARD.

(a) ESTABLISHMENT.—There is established a Commerce Technology Advisory Board (hereafter in this section referred to as the "Advisory Board"), the purpose of which is to advise the Secretary, Under Secretary, and Director regarding ways in which to—

(1) promote the development and rapid application of advanced commercial technologies, including advanced manufacturing technologies such as skill-based production technologies;

(2) strengthen the programs of the Technology Administration; and

(3) generally improve the global competitiveness of industries within the United States.

(b) COMPOSITION.—The Advisory Board shall be composed of at least 17 members, appointed by the Under Secretary from among individuals who, because of their experience and accomplishments in technology development, business development, or finance are exceptionally qualified to analyze and formulate policy that would improve the global competitiveness of industries in the United States. The Under Secretary shall designate one member to serve as chairman. Membership of the Advisory Board shall be composed of—

(1) representatives of—

(A) United States small businesses;

(B) other United States businesses;

(C) research universities and independent research institutes;

(D) State and local government agencies involved in industrial extension;

(E) national laboratories;

(F) industrial, worker, and technical and professional organizations; and

(G) financial organizations; and

(2) other individuals that possess important insight to issues of national competitiveness.

(c) MEETINGS.—(1) The chairman shall call the first meeting of the Advisory Board not later than 90 days after the date of enactment of this section.

(2) The Advisory Board shall meet at least once every 6 months, and at the call of the Under Secretary.

(d) TRAVEL EXPENSES.—Members of the Advisory Board, other than full-time employees of the United States, shall be allowed travel expenses in accordance with subchapter I of chapter 57 of title 5,

United Stated Code, while engaged in the business of the Advisory Board.

(e) Consultation.—In carrying out this section, the Under Secretary shall consult with other agencies, as appropriate. The Advisory Board, as appropriate, shall establish communication and coordination mechanisms with other Federal advisory committees to help ensure integrated Federal-private consideration of technology and manufacturing policies and programs.

(f) Termination.—Section 14 of the Federal Advisory Committee Act shall not apply to the Advisory Board.

TITLE II—FEDERAL TECHNOLOGY TRANSFER

SEC. [11] *201.* UTILIZATION OF FEDERAL TECHNOLOGY.

(a) through (h) * * *

(i) Research Equipment.—The Director of a laboratory, or the head of any Federal agency or department, may *loan, lease, or* give research equipment that is excess to the needs of the laboratory, agency, or department to an educational institution or nonprofit organization for the conduct of technical and scientific education and research activities. *Actions taken under this subsection shall not be subject to Federal requirements on the disposal of property.* Title of ownership shall transfer with a gift under the section.

(j) Additional Technology Transfer Mechanisms.—In addition to the technology transfer mechanisms set forth in this section and section 202, the heads of Federal departments and agencies also may transfer technologies through the technology transfer, extension, and deployment programs of the Department of Commerce and the Department of Defense.

SEC. [12] *202.* COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENTS.

(a) * * *

(b) Enumerated Authority.—Under agreements entered into pursuant to subsection (a)(1), a Government-operated Federal laboratory, and, to the extend provided in an agency-approved joint work statement, a Government-owned, contractor-operated laboratory, may (subject to subsection (c) of this section)—

(1) accept, retain, and use funds, personnel, services, and property from collaborating parties and provide personnel, services, and property to collaborating parties;

(2) grant or agree to grant in advance, to a collaborating party, patent licenses or assignments, or options thereto, in any invention made in whole or in part by a laboratory employee under the agreement, retaining a nonexclusive, nontransferrable, irrevocable, paid-up license to practice the invention or have the invention practiced throughout the world by or on behalf of the Government and such other rights as the Federal laboratory deems appropriate;

(3) waive, subject to reservation by the Government of a nonexclusive, irrevocable, paid-up license to practice the invention or have the invention practiced throughout the world by or on behalf of the Government, in advance, in whole or in part, any right of ownership which the Federal Government

may have to any subject invention made under the agreement by a collaborating party or employee of a collaborating party;

(4) determine rights in other intellectual property developed under an agreement entered into under subsection (a)(1); and

(5) to the extent consistent with any applicable agency requirements and standards of conduct, permit employees or former employees of the laboratory to participate in efforts to commercialize inventions they made while in the service of the United States.

A Government-owned, contractor-operated laboratory that enters into a cooperative research and development agreement under subsection (a)(1) may use or obligate royalties or other income accruing to such laboratory under such agreement with respect to any invention only (i) for payments to investors; (ii) for the purposes described in [section 14(a)(1)(B) (i), (ii), and (iv)] *section 204(a)(1)(B) (i), (ii), and (iv)*; and (iii) for scientific research and development consistent with the research and development mission and objectives of the laboratory.

(c) * * *

(d) DEFINITION.—as used in this section—

(1) the term "cooperative research and development agreement" means any agreement between one or more Federal laboratories and one or more non-Federal parties under which the Government, through its laboratories, provides personnel, services, facilities, equipment, intellectual property, or other resources *(including both real and personal property)* with or without reimbursement (but not funds to non-Federal parties) and the non-Federal parties provide funds, personnel, services, facilities, equipment, intellectual property, or other resources *(including both real and personal property)* toward the conduct of specified research or development efforts which are consistent with the missions of the laboratory; except that such term does not include a procurement contract or cooperative agreement as those terms are used in section 6303, 6304, and 6305 of title 31, United States Code;

(2) through (3) * * *

(e) through (g) * * *

SEC. [13] *203.* REWARDS FOR SCIENTIFIC, ENGINEERING, AND TECHNICAL PERSONNEL OF FEDERAL AGENCIES.

* * * * * * *

SEC. [14] *204.* DISTRIBUTION OF ROYALTIES RECEIVED BY FEDERAL AGENCIES.

(a) IN GENERAL.—(1) Except as provided in paragraphs (2) and (4), any royalties or other income received by a Federal agency from the licensing or assignment of inventions under agreements entered into by Government-operated Federal laboratories under [section 12] *section 202*, and inventions of Government-operated Federal laboratories licensed under section 207 of title 35, United States Code, or under any other provision of law, shall be retained by the agency whose laboratory produced the invention and shall be disposed of as follows:

(A) through (B) * * *

(2) through (4) * * *

(b) through (c) * * *

SEC. [15] *205*. EMPLOYEE ACTIVITIES.

* * * * * * *

SEC. [23] *206*. USE OF PARTNERSHIP INTERMEDIARIES.

(a) AUTHORITY.—Subject to the approval of the Secretary or head of the affected department or agency, the Director of a Federal laboratory, or in the case of a federally funded research and development center that is not a laboratory (as defined in [section 12(d)(2)] *section 202(d)(2)*, the Federal employee who is the contract officer, may—

(1) enter into a contract or memorandum of understanding with a partnership intermediary that provides for the partnership intermediary to perform services for the Federal laboratory that increase the likelihood of success in the conduct of cooperative or joint activities of such Federal laboratory with small business firms; and

(2) pay the Federal costs of such contract or memorandum of understanding out of funds available for the support of the technology transfer function pursuant to [section 11(b)] *section 201(b)* of this Act.

(b) PARTNERSHIP PROGRESS REPORTS.—The Secretary shall include in each triennial report required under [section 6(d)] *section 102(d)* of this Act a discussion and evaluation of the activities carried out pursuant to this section during the period covered by the report.

(c) * * *

TITLE III—MANUFACTURING TECHNOLOGY

SEC. 301. STATEMENT OF POLICY.

Congress declares that it is the policy of the United States that—

(1) Federal agencies, particularly the Department of Commerce, shall work with industry and labor to ensure that within 10 years of the date of enactment of this title the United States is second to no other nation in the development, deployment, and use of advanced manufacturing technologies;

(2) all the major Federal research and development agencies shall place a high priority on the development and deployment of skill-based and advanced manufacturing technologies, and shall work closely with United States industry and with the Nation's universities to develop and test those technologies;

(3) since the development of new skills in the existing and entry workforce, and the development of new organizational and managerial approaches, are integral parts of successfully deploying advanced manufacturing and related technologies, advanced workplace practices should be developed and deployed simultaneously and in a coordinated fashion with the development and deployment of advanced manufacturing technologies; and

(4) other Federal departments and agencies which work with civilian industry and labor may, as appropriate and consistent

with applicable statutes and duties, work with the Department of Commerce.

SEC. 302. ROLE OF THE DEPARTMENT OF COMMERCE.

(a) In General.—The Department of Commerce shall, consistent with the policy declared in section 301, work with United States industry and labor and, as appropriate, other Federal departments and agencies to—

(1) help develop new generic advanced manufacturing technologies, including advanced flexible computer-integrated manufacturing systems and electronic communications networks;

(2) assist the States and the private sector to help United States manufacturers, especially small- and medium-sized manufacturing enterprises, to adopt best current manufacturing technologies and workplace practices and, as appropriate, new advanced manufacturing equipment and techniques; and

(3) work with the private sector, other Federal departments and agencies, State and local governments, and educational institutions as a catalyst to help develop new manufacturing business practices and arrangements, accounting standards, improved supplier-customer relations, manufacturing modernization and investment justification strategies, and other steps which would accelerate the development, deployment, and use of advanced manufacturing technologies by United States industry, as well as evaluate foreign programs to modernize manufacturing.

(b) Twenty-First Century Manufacturing Infrastructure Program.—(1) As one important step to carry out the responsibilities of the Department of Commerce under subsection (a), there is established within the Institute a Twenty-First Century Manufacturing Infrastructure Program, which shall include—

(A) the Advanced Manufacturing Technology Development Program established under section 303 of this Act; and

(B) the Manufacturing Extension Partnership established under section 304 of this Act and the associated programs established under sections 25 and 26 of the National Institute of Standards and Technology Act (15 U.S.C. 278k and 278l).

(2) The Secretary through the Under Secretary and the Director, may accept the transfer of funds from any other Federal agency and may use those funds to implement the Twenty-First Century Manufacturing Infrastructure Program and support its activities.

SEC. 303. ADVANCED MANUFACTURING TECHNOLOGY DEVELOPMENT PROGRAM.

(a) Program Direction.—The Secretary, through the Under Secretary and the Director, shall establish an Advanced Manufacturing Technology Department Program which shall include advanced manufacturing systems and networking projects.

(b) Program Goal.—The goal of the Advanced Manufacturing Technology Development Program is to create collaborative multiyear technology development programs involving United States industry and, as appropriate, other Federal agencies, the States, worker organizations, universities, and other interested persons, in order to develop, refine, test, and transfer design and manufacturing technologies and associated applications, including advanced

computer integration, skill-based manufacturing systems, networking, and electronic data exchange.

(c) Program Components.—The Advanced Manufacturing Technology Development Program shall include—

(1) the advanced manufacturing research and development activities of the Institute; and

(2) one or more technology development testbeds within the United States, selected in accordance with procedures, including cost sharing, established for the Advanced Technology Program under section 28 of the National Institute of Standards and Technology Act (15 U.S.C. 278n), whose purpose shall be to develop, refine, test, and transfer advanced manufacturing and networking technologies and associated applications through a direct manufacturing process.

(d) Activities.—The Advanced Manufacturing Technology Development Program under the coordination of the Secretary, through the Director and, as appropriate, in consultation with other Federal officials, shall—

(1) test and, as appropriate, develop the equipment, computer software, and systems integration necessary for the successful operation within the United States of advanced design and manufacturing systems and associated electronic networks, with an emphasis on technologies which both promote United States economic competitiveness and build on and expand the skills of United States workers;

(2) establish at the Institute and the technology development testbed or testbeds—

(A) prototype advanced computer-integrated manufacturing systems; and

(B) prototype electronic networks linking manufacturing systems, including networks linking customer firms and supplier firms;

(3) assist industry to develop and implement voluntary consensus standards relevant to advanced computer-integrated manufacturing operations, including standards for networks, electronic data interchange, and digital product data specifications;

(4) help to make high-performance computing and networking technologies an integral part of design and production processes where appropriate;

(5) conduct research to identify and overcome technical barriers to the successful and cost-effective operation of advanced manufacturing systems and networks;

(6) facilitate industry efforts to develop and test new applications for manufacturing systems and networks, including both highly flexible and low-pollution manufacturing technologies;

(7) conduct research in advanced workplace practices related to and necessary for the successful deployment of advanced manufacturing technologies;

(8) involve in the Advanced Manufacturing Technology Development Program, to the maximum extent practicable, both those United States companies which make manufacturing and computer equipment and a broad range of personnel from those companies which buy the equipment;

(9) identify training needs, as appropriate, for company managers, engineers, and employees in the operation and applications of advanced manufacturing technologies and networks, with a particular emphasis on training for production workers in the effective use of new technologies;

(10) work with private industry, worker organizations, the Department of Labor, technical and professional societies, universities, and other interested parties to develop standards for the use of advanced computer-based training systems, including multimedia and interactive learning technologies that assure that production workers effectively learn, adapt, and utilize advanced manufacturing technologies and workplace practices;

(11) involve small- and medium-sized manufacturers in its activities;

(12) exchange information and personnel, as appropriate, between the technology development testbeds and the electronic networks created under this section; and

(13) incorporate and experiment with source reduction techniques and technologies at the testbed or testbeds, consulting, as appropriate, with other Federal officials.

(e) TESTBED AWARDS.—(1) In selecting applicants to receive awards under subsection (c)(2), the Secretary shall give particular consideration to applications that have existing computer expertise in the management of business, product, and process information such as digital data product and process technologies and customer-supplier information systems, and the ability to diffuse such expertise into industry, and that, in the case of joint research and development ventures, include both suppliers and users of advanced manufacturing and computer equipment or systems.

(2) An industry-led joint research and development venture applying for an award under subsection (c)(2) may include one or more State research organizations, universities, independent research organizations, or Regional Centers for the Transfer of Manufacturing Technology, as created under section 25 of the National Institute of Standards and Technology Act (15 U.S.C. 278k).

(f) ADVICE AND ASSISTANCE.—(1) Within 6 months after the date of enactment of this title, and before any request for proposals is issued, the Secretary shall hold one or more workshops to solicit advice from United States industry and worker organizations and from other Federal agencies, particularly the Departments of Defense and Labor, regarding the specific missions and activities of the testbeds.

(2) The Secretary shall, to the greatest extent possible, coordinate activities under this section with activities of other Federal agencies and initiatives relating to Computer-Aided Acquisition and Logistics Support, electronic data interchange, flexible computer-integrated manufacturing, and enterprise integration.

(3) The Secretary may request and accept funds, facilities, equipment, or personnel from other Federal agencies in order to carry out responsibilities under this section.

(g) APPLICATION OF ANTITRUST LAWS.—Nothing in this section shall be construed to create any immunity to any civil or criminal action under any Federal or State antitrust law, or to alter or re-

strict in any manner the applicability of any Federal or State antitrust law.

SEC. 304. MANUFACTURING EXTENSION PARTNERSHIP.

(a) ESTABLISHMENT AND PURPOSE.—There is established a Manufacturing Extension Partnership (hereafter in this section referred to as the "Partnership"). The Secretary, acting through the Under Secretary and the Director, shall implement and coordinate the Partnership in accordance with an initial plan that shall be prepared and submitted to Congress within 6 months after the date of enactment of this title and a 5-year plan for the Partnership that shall be submitted to Congress within 1 year after such date of enactment. The 5-year plan shall be updated and submitted to Congress annually. The purpose of the Partnership is to link and strengthen the Nation's manufacturing extension centers and activities in order to assist United States manufacturers, especially small- and medium-sized firms, to expand and accelerate the use of modern manufacturing practices, and to accelerate the development and use of advanced manufacturing technology and advanced workplace practices.

(b) COMPONENTS.—The Partnership shall be a cooperative effort of the Department of Commerce, the States, industry and labor, nonprofit organizations, and, as appropriate, other Federal agencies to provide a national system of manufacturing extension centers and technical services to United States companies, particularly small- and medium-sized manufacturers. The Partnership shall include the following components:

(1) Manufacturing Outreach Centers, as authorized under subsection (c);

(2) Regional Centers for the Transfer of Manufacturing Technology, as established under section 25 of the National Institute of Standards and Technology Act (15 U.S.C. 278k), and the State Technology Extension Program, as established under section 26 of the National Institute of Standards and Technology Act (15 U.S.C. 2781);

(3) an activity, coordinated and funded by the Institute, which links and supports Manufacturing Outreach Centers and Regional Centers for the Transfer of Manufacturing Technology, and which operates the information network provided for under subsection (d) and the clearinghouse system developed under subsection (e); and

(4) such technology and manufacturing extension centers supported by other Federal departments and agencies, States, industry, and nonprofit organizations as the Secretary may deem appropriate for inclusion in the Partnership.

(c) MANUFACTURING OUTREACH CENTERS.—(1) Government and private sector organizations, actively engaged in technology or manufacturing extension activities, may apply to the Secretary to be designated as Manufacturing Outreach Centers. Eligible organizations may include Federal, State, and local government agencies, their extension programs, and their laboratories; small business development centers; and appropriate programs run by professional and technical societies, worker organizations, industrial organizations, for-profit or nonprofit organizations, community development organizations, State universities and other universities, community col-

leges, and technical schools and colleges, including, where appropriate, vendor-supported demonstrations of production applications.

(2) Any Regional Center for the Transfer of Manufacturing Technology may apply to the Secretary to establish a Manufacturing Outreach Center, managed by or in cooperation with such Regional Center, which extends the effective service area of such Regional Center. Funding for the establishment and management of such Outreach Center may be awarded to such Regional Center, notwithstanding the restrictions of paragraph (5).

(3) The Secretary shall establish terms and conditions of participation and may provide financial assistance, on a cost-shared basis and through competitive, merit-based review processes, to nonprofit or government participants throughout the United States to enable them to—

(A) join the Partnership and disseminate its technical and information services to United States manufacturing firms, particularly small- and medium-sized firms; and

(B) strengthen their direct assistance to small- and medium-sized United States manufacturing firms to expand and accelerate the use of modern and advanced manufacturing practices.

(4) If a State plan for technology extension exists in a State where an applicant for financial assistance under this subsection is operating or plans to operate, the applicant shall demonstrate in its application that its proposal is compatible with such a State plan.

(5) If a Manufacturing Outreach Center is in or near a State which has a Regional Center for the Transfer of Manufacturing Technology, the director shall, as appropriate, encourage the Outreach Center to cooperate with the Regional Center in coordinating its proposals and ongoing programs to serve manufacturers in the region. Manufacturing Outreach Centers may not concurrently be designated as Regional Centers for the Transfer of Manufacturing Technology under section 25 of the National Institute of Standards and Technology Act.

(6) Financial assistance may be awarded under this subsection for an initial period not to exceed 3 years and may, subject to successful evaluation by the Institute, be renewed for additional periods, not to exceed 3 years each. Such assistance may not at any time exceed 50 percent of the operating costs and in-kind contributions of the recipient.

(d) MANUFACTURING EXTENSION INFORMATION NETWORK.—The Department of Commerce shall provide for an instantaneous, interactive information network to serve the Partnership, to facilitate interaction among Manufacturing Outreach Centers, Regional Centers for the Transfer of Manufacturing Technology, and Federal agencies, and to permit the collection and dissemination in electronic form, in a timely and accurate manner, of information described in subsection (e). Such information network shall, wherever practicable, make use of existing computer networks, data bases, and electronic bulletin boards. Information network arrangements, including user fees and appropriate electronic access for information suppliers and users, shall be addressed in the 5-year plan prepared under subsection (a). The Secretary shall, to the extent practicable, coordinate these information network activities with the relevant activities of other Federal agencies, particularly the advanced manu-

facturing and enterprise integration activities of the Department of Defense.

(e) CLEARINGHOUSE.—(1) The Secretary shall develop a clearinghouse system, using the Institute, the National Technical Information Service, and private sector information providers and carriers, where appropriate, to—

(A) identify expertise and acquire information, appropriate to the purpose of the Partnership stated in subsection (a), from all available Federal sources, and where appropriate from other sources, providing assistance where necessary in making such information electronically available and compatible with the information network established under subsection (d);

(B) ensure ready access by United States manufacturers and other interested private sector parties to the most recent relevant available such information and expertise; and

(C) to the extent practicable, inform such manufacturers of the availability of such information.

(2) The clearinghouse shall include information available electronically regarding—

(A) activities of Manufacturing Outreach Centers, Regional Centers for the Transfer of Manufacturing Technology, the State Technology Extension Program, and the users of the information network;

(B) domestic and international standards from the Institute and private sector organizations and other export promotion information, including conformity assessment requirements and procedures;

(C) the Malcolm Baidridge National Quality Award program, and quality principles and standards;

(D) manufacturing processes that minimize waste and negative environmental impact;

(E) advanced workplace practices that can improve quality, response time, and flexibility in manufacturing;

(F) federally funded technology development and transfer programs;

(G) responsibilities assigned to the Clearinghouse for State and Local Initiatives on Productivity, Technology, and Innovation under section 102;

(H) how to access data bases and services;

(I) skills training, particularly for production workers, that is available through trade and professional organizations, federally supported programs, State resources, private industry, or other organizations; and

(J) other subjects relevant to the ability of companies to manufacture and sell competitive products throughout the world.

(f) PRINCIPLES.—In carrying out this section, the Department of Commerce shall take into consideration the following principles:

(1) The Partnership and the information network provided for under subsection (d) shall be established and operated through cooperation and co-funding among Federal, State and local governments, other public and private contributors, and end users.

(2) The Partnership and the information network shall utilize and leverage, to the extent practicable, existing organizations, data bases, electronic networks, facilities, and capabilities, and

shall be designed to complement rather than supplant State and local programs.

(3) The Partnership should, to the extent practicable, involve key stakeholders at all levels in the planning and governance of modernization strategies; concentrate on assisting local clusters of firms; assist rural as well as urban manufacturers; promote collaborative learning and cooperative action among manufacturers; link industrial modernization programs tightly to existing and future Federal training initiatives, including those for youth apprenticeship programs and for assisting other workers; encourage small firms to seek modernization services by working with major manufacturers to strengthen and coordinate their supplier assessment, certification, and development programs; encourage small firms, as appropriate, to select manufacturing equipment and practices which build upon and expand the skills of their employees; identify and honor best practices by firms and the programs that support them, including both technology and workplace practices; provide funding based on performance and ensure rigorous evaluation of extension services; as appropriate, coordinate Federal programs that support manufacturing modernization; work with Federal, State, local, and private organizations so that Manufacturing Outreach Centers and Regional Centers for the Transfer of Manufacturing Technology can provide referrals to other important business services, such as assistance with financing, training, and exporting, and contribute to local business climates supportive of high-performance manufacturing.

(4) The Partnership and the information network provided for under subsection (d) shall be subject to all applicable provisions of law for the protection of trade secrets and business confidential information.

(5) Local or regional needs should determine the management structure and staffing of the Manufacturing Outreach Centers. The Partnership shall strive for geographical balance and for balance between urban and rural recipients, with the ultimate goal of access for all United States manufacturers.

(6) Manufacturing Outreach Centers should have the capability to deliver outreach services directly to manufacturers; actively work with, rather than supplant, the private sector; help firms assess needs regarding technology, workplace practices, and training; and to the extent practicable, maximize the exposure of manufacturers to demonstrations of modern technologies in use.

(7) Manufacturing Outreach Centers shall focus, where possible, on the the development and deployment of flexible manufacturing technologies and practices applicable to both defense and commercial applications and on opportunities to modernize operations in ways which improve productivity, reduce waste and pollution, and increase energy efficiency.

(8) The Department of Commerce shall develop mechanisms for—

(A) soliciting the perspectives of manufacturers using the services of the Manufacturing Outreach Centers and Re-

gional Centers for the Transfer of Manufacturing Technology;

(B) assisting in the training of technology extension agents and in helping them disseminate information on best available manufacturing technologies, including technologies for source reduction, and workplace practices; and

(C) rigorously evaluating the effectiveness of the Manufacturing Outreach Centers and other components of the Partnership.

(9) Nothing in this section shall be construed as limiting or interfering with any collective bargaining agreement. Regional Centers for the Transfer of Manufacturing Technology and Manufacturing Outreach Centers shall, as practicable, respect any collective bargaining agreement which is in force at a client firm.

(g) DISSEMINATION OF SOURCE REDUCTION AND ENERGY EFFICIENCY TECHNOLOGIES.—(1) The Regional Centers for the Transfer of Manufacturing Technology and Manufacturing Outreach Centers shall make available source reduction and energy efficiency assessments to their interested client companies. These assessments shall assist such interested client companies in identifying opportunities for energy conservation and source reduction, and thus reduce operating costs, through either improvement in manufacturing processes or the purchase of new equipment.

(2) The Secretary is authorized to work with other appropriate Federal officials and other parties to provide employees of Regional Centers and Outreach Centers with the training needed to carry out the assessments specified in paragraph (1).

SEC. 305. INDUSTRY-LED MANUFACTURING ADVISORY COMMITTEE.

(a) ESTABLISHMENT.—The Director of the Office of Science and Technology Policy, after consultation with the Secretary and other appropriate Federal officials, shall establish a Manufacturing Advisory Committee (hereafter in this section referred to as the "Committee"), led by United States industry officials, to provide to the Director of the Office of Science and Technology Policy advice and, as appropriate, guidance to Federal manufacturing programs.

(b) FUNCTIONS.—The Committee shall—

(1) collect and analyze information on the range of factors which determine the success of United States-based manufacturing industries, and particularly factors regarding the development and deployment of advanced manufacturing technologies and the application of best manufacturing practices;

(2) identify areas where appropriate cooperation between the Federal Government and industry and labor, including Government support for industry-led joint research and development ventures and for manufacturing extension activities, would enhance United States industrial competitiveness, and provide advice and guidance for such cooperative efforts;

(3) provide guidance on what Federal policies and practices are necessary to strengthen United States-based manufacturing, particularly Federal policies and practices regarding research budgets, interagency coordination and initiatives, technology transfer, regulation, and procurement; and

(4) generally develop recommendations for guiding Federal agency and interagency activities related to United States-based manufacturing.

(c) MEMBERSHIP AND PROCEDURES.—(1) The Committee shall be composed of 16 members, of whom—

(A) six members shall be the director of the Office of Science and Technology Policy, the Secretary, the Secretary of Defense, the Secretary of Energy, the Secretary of Labor, and the Director of the National Science Foundation, or their designees; and

(B) 10 members shall, within 120 days after the date of enactment of this title, be appointed by the President, acting through the Director of the Office of Science and Technology Policy, from the private manufacturing industry, worker organizations, technical and professional societies, State technology agencies, and academia.

At least two of the members appointed under subparagraph (B) shall be from small business.

(2) The Director of the Office of Science and Technology Policy or such Director's designee shall chair the Committee.

(3) The chairman shall call the first meeting of the Committee within 30 days after the appointment of members is completed.

(4) The Committee may use such personnel detailed from Federal agencies as may be necessary to enable it to perform its functions.

(5) Nine members of the Committee shall constitute a quorum for the transaction of business.

(6) Members of the Committee, other than full-time employees of the Federal Government, while attending meetings of the Committee or otherwise performing duties of the Committee while away from their homes or regular places of business, shall be allowed travel expenses in accordance with subchapter I of chapter 57 of title 5, United States Code.

(7) The Committee shall submit a report of its activities once every year after its establishment to the President, the Committee on Commerce, Science, Transportation of the Senate, and the Committee on Science, Space, and Technology of the House of Representatives.

(8) The Committee, as appropriate, shall work with the Commerce Technology Advisory Board established under section 113 of this Act and with other appropriate Federal advisory mechanisms to ensure integrated Federal-private consideration of technology and manufacturing policies and programs.

(d) AUTHORIZATION OF APPROPRIATIONS.—There are authorized to be appropriated to carry out this section such sums as may be necessary for the fiscal years 1994 and 1995.

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY ACT

Section 25 of That Act

REGIONAL CENTERS FOR THE TRANSFER OF MANUFACTURING TECHNOLOGY

SEC. 25. (a) The Secretary, through the Director and, if appropriate, through other officials, shall provide assistance for the creation and support of Regional Centers for the Transfer of Manufacturing Technology (hereinafter in this Act referred to as the "Centers"). Such centers shall be affiliated with any United States-based nonprofit institution or organization, or group thereof, that applies for and is awarded financial assistance under this section in accordance with the description published by the Secretary in the Federal Register under subsection (c)(2). Individual awards shall be decided on the basis of merit review. The objective of the Centers is to enhance productivity and technological performance in United States manufacturing through—

(1) the transfer of manufacturing technology and techniques developed at the Institute to Centers and, through them, to manufacturing companies throughout the United States;

(2) the participation of individuals from industry, universities, State governments, other Federal agencies, and, when appropriate, the Institute in cooperative technology transfer activities;

(3) efforts to make new manufacturing technology and processes usable by United States-based small- and medium-sized companies;

(4) the active dissemination of scientific, engineering, technical, and management information about manufacturing to industrial firms, including small- and medium-sized manufacturing companies; **[and]**

(5) the utilization, when appropriate, of the expertise and capability that exists in Federal laboratories other than the Institute**[.]**;

(6) the active dissemination of information on advanced workplace practices and available education and training programs, and the encouragement of companies to train workers in the effective use of modern and advanced manufacturing technologies; and

(7) demonstration projects in which Centers work with States, local governments, community development organizations, worker and business organizations, and community banks to create a business climate supportive of high-performance manufacturing.

(b) The activities of the Centers shall include—

(1) the establishment of automated manufacturing systems and other advanced production technologies, based on research by the Institute, for the purpose of demonstrations and technology transfer;

(2) the active transfer and dissemination of research findings and Center expertise to a wide range of companies and enterprises, particularly small- and medium-sized manufacturers; **[and]**

(3) assessments of client firms' modernization needs, assistance in implementing quality processes, and, where needed, cooperation with training institutions to ensure that employees, particularly production workers, receive training in the most effective use of manufacturing technology and advanced workplace practices; and

[(3)] *(4)* loans, on a selective, short-term basis, of items of advanced manufacturing equipment to small manufacturing firms with less than 100 employees.

(c) (1) through (4) * * *

(5) Each Center which receives financial assistance under this section shall be evaluated during its third year of operation by an evaluation panel appointed by the Secretary. Each such evaluation panel shall be composed of private experts, none of whom shall be connected with the involved Center, and Federal officials. An official of the Institute shall chair the panel. Each evaluation panel shall measure the involved Center's performance against the objectives specified in this section. The Secretary shall not provide funding for the fourth through the sixth years of such Center's operation unless the evaluation is positive. If the evaluation is positive, the Secretary may provide continued funding through the sixth year at declining levels, [which are designed to ensure that the Center no longer needs financial support from the Institute by the seventh year. In no event shall funding for a Center be provided by the Department of Commerce after the sixth year of the operation of a Center.] *to a maximum of one-third Federal funding. Each Center which receives financial assistance under this section shall be evaluated during its sixth year of operation, and at such subsequent times as the Secretary considers appropriate, by an evaluation panel appointed by the Secretary in the same manner as was the evaluation panel previously appointed. The Secretary shall not provide funding for additional years of the Center's operation unless the evaluation is positive and the Secretary finds that continuation of funding furthers the goals of the Department. Such additional Federal funding shall not exceed one-third of the cost of the Center's operations.*

(6) * * *

(d) * * *

(e) If a Center receives a positive evaluation during its third year of operation, the Director may, any time after that evaluation, contract with the Center to provide additional technology extension or transfer services above and beyond the baseline activities of the Center. Such additional services may include, but are not necessarily limited to, the development and operation of the following:

(1) Services focused on the testing, development, and application of manufacturing and process technologies within specific technical fields such as advanced materials or electronics fabrication for the purpose of assisting United States companies, both within the Center's original service region and in other regions, to improve manufacturing, product design, workforce training, and production in those specific technical fields.

(2) Assistance to small- and medium-sized firms in fields of manufacturing other than the field or fields originally served by the Center.

(3) Industrial service facilities which provide tools to help companies with the low-cost, low-volume, rapid prototyping of a range of new products and the refinement of the manufacturing and process technologies necessary to make such products.

(4) Programs to assist small- and medium-sized manufacturers and their employees, particularly production workers, in the Center's region to learn and apply the technologies, techniques, and processes associated with systems management technology,

electronic commerce, pollution minimization, or the improvement of manufacturing productivity.

(5) Industry-led demonstration programs that explore the value of innovative nonprofit manufacturing technology consortia to provide ongoing research, technology transfer, and worker training assistance for industrial members. An award under this paragraph shall be for no more than $500,000 per year, and shall be subject to renewal after a 1-year demonstration period.

Section 26 of That Act

REGIONAL CENTERS FOR THE TRANSFER OF MANUFACTURING TECHNOLOGY

SEC. 26. (a) *There is established within the Institute a State Technology Extension Program.* In addition to the Centers program created under section 25, the Secretary, through the Director and, if appropriate, through other officials, shall provide technical assistance *through that Program* to State technology programs throughout the United States, in order to help those programs help businesses, particularly small- and medium-size businesses, to enhance their competitiveness through the application of science and technology.

(b) * * *

(c) In addition to the general authorities listed in subsection (b), the State Technology Extension Program also shall, through merit-based competitive review processes and as authorizations and appropriations permit—

(1) make awards to States and conduct workshops, pursuant to section 5121(b) of the Omnibus Trade and Competitiveness Act of 1988 (15 U.S.C. 2781 note) in order to help States improve their planning and coordination of technology extension activities;

(2) assist States, particularly States which historically have had no manufacturing or technology extension programs or only small programs, to plan, develop, and coordinate such programs and to help bring those State programs to a level of performance where they can apply successfully for awards to establish Manufacturing Outreach Centers, Regional Centers for the Transfer of Manufacturing Technology, or both;

(3) support industrial modernization demonstration projects to help States create networks among small manufacturers for the purpose of facilitating technical assistance, group services, and improved productivity and competitiveness;

(4) support State efforts to develop and test innovative ways to help small- and medium-sized manufacturers improve their technical capabilities, including, as appropriate, State contracts with private-sector technology transfer companies to provide technology assistance and development services that are beyond the current capacity of a given State's industrial extension activities;

(5) support State efforts designed to help small manufacturers in rural as well as urban areas improve and modernize their

technical capabilities, including, as appropriate, interstate efforts to achieve such end;

(6) support State efforts to assist interested small defense manufacturing firms to convert their production to nondefense or dual-use purposes;

(7) support worker technology education programs in the States at institutions such as research universities, community colleges, technical and professional societies, labor education centers, labor-management committees, and worker organizations in production technologies critical to the Nation's future, with an emphasis on high-performance work systems, the skills necessary to use advanced manufacturing systems well, and best production practice; and support on-the-job training programs in the States to build and enhance the skills of employees, particularly production workers, in small- and medium-sized companies; and

(8) help States develop programs to train personnel who in turn can provide technical skills to managers and workers of manufacturing firms.

Section 28 of That Act

ADVANCED TECHNOLOGY PROGRAM

SEC. 28. (a) * * *

(b) Under the Program established in subsection (a), and consistent with the mission and policies of the Institute, the Secretary, acting through the Director, and subject to subsections (c) and (d), may—

(1) aid industry-led United States joint research and development ventures (hereafter in this section referred to as "joint ventures" which may also include universities and independent research organizations), including those involving collaborative technology demonstration projects which develop and test prototype equipment and processes, through—

(A) provision of organizational and technical advice; and

(B) participation in such joint ventures by means of grants, cooperative agreements, **[**or contracts,**]** *contracts, and other transactions* if the Secretary, acting through the Director, determines participation to be appropriate, which may include (i) partial start-up funding, (ii) **[**provision of a minority share of the cost of such joint ventures for up to 5 years**]** *the option of providing either a minority share of the total cost of such joint ventures for up to 5 years, or only direct costs (and not indirect costs, profits, or management fees), for up to 5 years,* and (iii) making available equipment, facilities, and personnel,

provided that emphasis is placed on areas where the Institute has scientific or technological expertise, on solving generic problems of specific industries, and on making those industries more competitive in world markets;

(2) provide grants to and enter into contracts **[**and cooperative agreements**]** *cooperative agreements, and other transactions* with United States businesses (especially small businesses), provided that emphasis is placed on applying the Insti-

tute's research, research techniques, and expertise to those organizations' research programs;

(3) involve the Federal laboratories in the Program, where appropriate using among other authorities the cooperative research and development agreements provided for under section 12 of the Stevenson-Wydler Technology Innovation Act of 1980; **[**and**]**

(4) carry out, in a manner consistent with the provisions of this section, such other cooperative research activities with joint ventures as may be authorized by law or assigned to the program by the Secretary**[**.**]** *and*

(5) use other transactions authority under this subsection only when the Secretary, acting through the Director, determines that standard contracts, grants, or cooperative agreements are not feasible or appropriate, and only when other transaction instruments incorporate terms and conditions that reflect the use of generally accepted commercial accounting and auditing practices.

(c) through (j) * * *

(k) In addition to the general authority under this section to provide financial assistance to joint ventures, the Secretary, through the Director, also may, as permitted by levels of authorizations and appropriations, provide financial support to large-scale joint ventures requesting $20 million or more a year in Department funds. Any such support shall be subject to the matching funds requirements of subsection (b)(1)(B)(ii), except that the Secretary may provide assistance to such large-scale joint ventures for up to 7 years. The Secretary may work with industrial groups to develop such proposed large-scale joint ventures and shall give preference to proposals which represent a broad spectrum of companies for a given industry and which focus either on speeding the commercialization of important new technologies or on accelerating the development, testing, and deployment of valuable new process technologies and workplace practices. The Secretary and Director, as appropriate, shall obtain independent technical review of industry proposals submitted under this subsection.

(l) Notwithstanding subsections (b)(1)(B)(ii) and (d)(3), the Director may grant an extension of not to exceed 6 months beyond the deadlines established under those subsections for joint venture and single applicant awardees to expend Federal funds to complete their projects, if such extension may be granted with no additional cost to the Federal Government.

(m) The Secretary, Under Secretary, and Director may organize or attend workshops or use other mechanisms to encourage the leaders of specific United States industrial sectors to—

(1) identify which precompetitive, generic technologies will be most critical in the future to each such sector and, as appropriate, encourage the formation of broad-based industry-led joint ventures which seek to develop those technologies; and

(2) analyze which additional steps may be necessary to enable each sector to acquire, deploy, and finance needed technologies in a timely fashion.

HIGH PERFORMANCE COMPUTING ACT OF 1991

Section 3 of That Act

SEC. 3. PURPOSES.

The purpose of this Act is to help ensure the continued leadership of the United States in high-performance computing and its applications by—

(1) expanding Federal support for research, development, and application of high-performance computing in order to—

[(A) establish a high-capacity and high-speed National Research and Education Network;**]**

(A) accelerate the creation of a universally accessible broadband telecommunications network for the Nation;

(B) through (I) * * *

(2) * * *

Section 4 of That Act

SEC. 4. DEFINITIONS.

As used in this Act, the term—

(1) "Director" means the Director of the Office of Science and Technology Policy;

(2) "Grand Challenge" means a fundamental problem in science or engineering, with broad economic and scientific impact, whose solution will require the application of high-performance computing resources;

(3) "high-performance computing" means advanced computing, communications, and information technologies, including scientific workstations, supercomputer systems (including vector supercomputers and large scale parallel systems), high-capacity and high-speed networks, special purpose and experimental systems, and applications and systems software;

(4) "Network" means a computer network referred to as the National Research and Education Network established under section 102*, which consists of that portion of the Internet which receives direct Federal subsidy*; and

(5) "Program" means the National High-Performance Computing Program described in section 101.

Section 101 of That Act

SEC. 101. NATIONAL HIGH-PERFORMANCE COMPUTING PROGRAM.

(a) NATIONAL HIGH-PERFORMANCE COMPUTING PROGRAM.—(1) * * *

(2) The Program shall—

(A) provide for the establishment of policies for management and access to the Network;

(B) provide for oversight of the operation and evolution of the Network;

(C) through (G) * * *

(H) provide for educating and training additional undergraduate and graduate students in software engineering, computer science, library and information science, and computational science; **[**and**]**

(I) provide—

(i) for the security requirements, policies, and standards necessary to protect Federal research computer networks and information resources accessible through Federal research computer networks, including research required to establish security standards for high-performance computing systems and networks; and

(ii) that agencies and departments identified in the annual report submitted under paragraph (3)(A) shall define and implement a security plan consistent with the Program and with applicable law[.]*; and*

(J) not provide for the building, ownership, or operation of data communications networks by the Federal Government, or any State or local government, or any agency or instrumentality thereof, unless such networks are either (i) test bed networks or (ii) networks operated for government mission purposes, including military purposes.

(3) through (4) * * *

[(b) HIGH-PERFORMANCE COMPUTING ADVISORY COMMITTEE.—The President shall establish an advisory committee on high-performance computing consisting of non-Federal members, including representatives of the research, education, and library communities, network providers, and industry, who are specially qualified to provide the Director with advice and information on high-performance computing. The recommendations of the advisory committee shall be considered in reviewing and revising the Program. The advisory committee shall provide the Director with an independent assessment of—

[(1) progress made in implementing the Program;

[(2) the need to revise the Program;

[(3) the balance between the components of the Program;

[(4) whether the research and development undertaken pursuant to the Program is helping to maintain United States leadership in computing technology; and

[(5) other issues identified by the Director.]

(b) HIGH-PERFORMANCE COMPUTING AND APPLICATIONS ADVISORY COMMITTEE.—The Director shall establish an advisory committee on high-performance computing and applications consisting of non-Federal members, including representatives of the research, elementary and secondary education, higher education, and library communities, consumer and public interest groups, network providers, and the computer, telecommunications, and information and publishing industries, who are specially qualified to provide the Director with advice and information on high-performance computing and on applications of computing and networking. The recommendations of the advisory committee shall be considered in reviewing and revising the Program, and the Plan required by section 301(2). The advisory committee shall provide the Director with an independent assessment of—

(1) progress in implementing the Program and the Plan;

(2) the need to revise the Program and the Plan;

(3) the balance between the components of the activities undertaken pursuant to this Act;

(4) whether the research, development, and demonstration projects undertaken pursuant to this Act are helping to maintain United States leadership in computing and networking technologies and in the application of those technologies;

(5) whether the applications developed under title III are successfully addressing the needs of the targeted populations, including assessment of the number of users served by those applications; and

(6) other issues identified by the Director.

(c) * * *

Section 102 of That Act

[SEC. 102. NATIONAL RESEARCH AND EDUCATION NETWORK.

[(a) ESTABLISHMENT.—As part of the Program, the National Science Foundation, the Department of Defense, the Department of Energy, the Department of Commerce, the National Aeronautics and Space Administration, and other agencies participating in the Program shall support the establishment of the National Research and Education Network, portions of which shall, to the extent technically feasible, be capable of transmitting data at one gigabit per second or greater by 1996. The Network shall provide for the linkage of research institution and educational institutions, government, and industry in every State.

[(b) ACCESS.—Federal agencies and departments shall work with private network service providers, State and local agencies, libraries, educational institutions and organizations, and others, as appropriate, in order to ensure that the researchers, educators, and students have access, as appropriate to the Network. The Network is to provide users with appropriate access to high-performance computing systems, electronic information resources, other research facilities, and libraries. The Network shall provide access, to the extent practicable, to electronic information resources maintained by libraries, research facilities, publishers, and affiliated organizations.

[(c) NETWORK CHARACTERISTICS.—The Network shall—

[(1) be developed and deployed with the computer, telecommunications, and information industries;

[(2) be designed, developed, and operated in collaboration with potential users in government, industry, and research institutions and educational institutions;

[(3) be designed, developed, and operated in a manner which fosters and maintains competition and private sector investment in high-speed data networking within the telecommunications industry;

[(4) be designed, developed, and operated in a manner which promotes research and development leading to development of commercial data communications and telecommunications standards, whose development will encourage the establishment of privately operated high-speed commercial networks;

[(5) be designed and operated so as to ensure the continued application of laws that provide network and information resources security measures, including those that protect copyright and other intellectual property rights, and those that control access to data bases and protect national security;

[(6) have accounting mechanisms which allow users or groups of users to be charged for their usage of copyrighted materials available over the Network and, where appropriate and technically feasible, for their usage of the Network;

[(7) ensure that interoperability of Federal and non-Federal computer networks, to the extend appropriate, in a way that allows autonomy for each component network;

[(8) be developed by purchasing standard commercial transmission and network services from vendors whenever feasible, and by contracting for customized services when not feasible, in order to minimize Federal investment in network hardware;

[(9) support research and development of network software and hardware; and

[(10) serve as a test bed by further research and development of high-capacity and high-speed computing networks and demonstrate how advance computers, high-capacity and high-speed computing networks, and data bases can improve the national information infrastructure.

[(d) DEFENSE ADVANCED RESEARCH PROJECT AGENCY RESPONSIBILITY.—As part of the Program, the Department of Defense, through the Defense Advanced Research Projects Agency, shall support research and development of advanced fiber optics technology, switches, and protocols needed to develop the Network.

[(e) INFORMATION SERVICES.—The Director shall assist the President in coordinating the activities of appropriate agencies and departments to promote the development of information services that could be provided over the Network. These service may include the provisions of directories of the users and services on computer networks, data bases of unclassified Federal scientific data, training of users of data bases and computer networks, access to commercial information services for users of the Network, and technology to support computer-based collaboration that allows researchers and educators around the Nation to share information and instrumentation.

[(f) USE OF GRANT FUNDS.—All Federal agencies and department are authorized to allow recipients of Federal research grants to use grant moneys to pay for computer networking expenses.

[(g) REPORT TO CONGRESS.—Within one year after the date of enactment of this Act the Director shall report to the Congress on—

[(1) effective mechanisms for providing operating funds for the maintenance and use of the Network, including user fees, industry support, and continued federal investment;

[(2) the future operation and evolution of the Network;

[(3) how commercial information service providers could be charged for access to the Network, and how Network users could be charged for such commercial information services;

[(4) the technological feasibility of allowing commercial information service providers to use the Network and other federally funded research networks;

[(5) how to protect the copyrights of material distributed over the Network; and

[(6) appropriate policies to ensure the security of resources available on the Network and to protect the privacy of users of networks.]

SEC. 102. NATIONAL RESEARCH AND EDUCATION NETWORK PROGRAM.

(A) ESTABLISHMENT.—As part of the Program described in section 101, the National Science Foundation, the Department of Defense, the Department of Energy, the Department of Commerce, the National Aeronautics and Space Administration, and other agencies participating in the Program shall support the establishment of the National Research and Education Network Program. The Network Program shall consist of the following components:

(1) Research and development of broadband networking software and hardware.

(2) Experimental test bed networks for—

(A) developing and demonstrating advanced networking technologies resulting from the activities described in paragraph (1); and

(B) providing connections for purposes consistent with this Act which require levels of network capabilities not available from commercial networks operated by the private sector.

(3) Provision of support directly to researchers, educators, and students to obtain access to and use of the Internet to allow for communication with other individuals in the research and education communities and to allow for access to high-performance computing systems, electronic information resources, other research facilities, and libraries.

(b) TEST BED NETWORK CHARACTERISTICS.—The test bed networks shall—

(1) be developed and deployed in coordination with the computer, telecommunications, and information industries;

(2) be designed, developed, and operated in collaboration with potential users in government, industry, and research institutions and educational institutions;

(3) be designed, developed, and operated in a manner which fosters and maintains competition and private sector investment in high-speed data networking within the telecommunications industry;

(4) be designed and operated in a manner which promotes and encourages research and development leading to the creation of commercial data transmission standards, enabling the establishment of privately developed high-speed commercial networks;

(5) support enough sites, users, and applications to provide a realistic test of new networking technologies;

(6) be designed and operated so as to handle the application of laws that provide network and information resources security, including those that protect copyright and other intellectual property rights, and those that control access to databases and protect national security;

(7) have accounting mechanisms which allow users or groups of users to be charged for their usage of copyrighted materials available over the test bed networks and, where appropriate and technically feasible, for their usage of the test bed networks;

(8) be connected to and interoperable with Federal and non-Federal computer networks, to the extent appropriate, in a way that allows autonomy for each component network; and

(9) be developed by purchasing standard commercial transmission and network services from vendors whenever feasible, and by contracting for customized services when not feasible, in order to minimize Federal investment in network hardware.

(c) NETWORK ACCESS.—The Federal agencies and departments participating in activities under this section shall develop a plan with specific goals for implementing the requirements of subsection (a)(3), including provision for financial assistance to educational institutions, public libraries, and other appropriate entities. This plan shall be submitted to the Congress not later than one year after the date of enactment of the Information Technology Applications Program Act of 1993.

(d) RESTRICTIONS ON USE OF TEST BED NETWORKS.—(1) The test bed networks shall not be used to provide commercial network services that are not related to experimental activity conducted under this section and that could otherwise be provided satisfactorily by using commercially available network services.

(2) This subsection shall take effect 18 months after the date of enactment of the Information Technology Applications Program Act of 1993.

(e) ADVANCED RESEARCH PROJECTS AGENCY RESPONSIBILITY.—As part of the Program, the Department of Defense, through the Advanced Research Projects Agency, shall support research and development of advanced fiber optics technology, switches, and protocols needed to develop the Network Program.

(f) INFORMATION SERVICES.—The Director shall assist the President in coordinating the activities of appropriate agencies and departments to promote the development of information services that could be provided over the Internet consistent with the purposes of this Act. These services may include the provision of directories of the users and services on computer networks, databases of unclassified Federal scientific data, training of users of databases and computer networks, and technology to support computer-based collaboration that allows researchers and educators around the Nation to share information and instrumentation.

(g) USE OF GRANT FUNDS.—All Federal agencies and departments are authorized to allow recipients of Federal research grants to use grant moneys to pay for computer networking expenses.

Title II of the Act

TITLE II—AGENCY ACTIVITIES

SECS. 201-208. * * *

TITLE III—INFORMATION TECHNOLOGY APPLICATION RESEARCH PROGRAM

SEC. 301. ESTABLISHMENT OF APPLICATIONS RESEARCH PROGRAM.

The Director, through the Federal Coordinating Council for Science, Engineering, and Technology, shall, in accordance with this title—

(1) establish a coordinated interagency applications research program to develop applications of computing and networking advances achieved under the Program described in section 101, that are designed (A) to be accessible and usable by all persons in the United States, in the fields of education, libraries, health care, the provision of government information, and other appropriate fields; and (B) to ensure privacy, security, and respect for copyrights; and

(2) develop a Plan for Computing and Networking Applications (hereafter in this title referred to as the "Plan") describing the goals and proposed activities of the applications research program established under paragraph (1), taking into consideration the recommendations of the advisory committee on high-performance computing and applications established under section 101(b).

The President shall designate the Federal agencies and departments which shall participate in the applications program established under paragraph (1).

SEC. 302. PLAN FOR COMPUTING AND NETWORK APPLICATIONS.

(a) REQUIREMENT.—The Plan shall contain recommendations for a 5-year national effort and shall be submitted to the Congress within 1 year after the date of enactment of this title. The Plan shall be resubmitted upon revision at least once every 2 years thereafter.

(b) CONTENTS.—The Plan shall—

(1) establish the goals and priorities for the Program for the fiscal year in which the Plan (or revised Plan) is submitted and the succeeding 4 fiscal years;

(2) set fourth the role of each Federal agency and department in implementing the Plan;

(3) describe the levels of Federal funding for each agency and department, and specific activities, required to achieve the goals and priorities established under paragraph (1);

(4) identify steps agencies will take in the applications research program to promote privacy, security, and respect for copyrights in Federal networks and computing applications; and

(5) assign particular agencies primary responsibility for developing particular National Challenges of high-performance computing and high-speed networks.

(c) ACCOMPANYING DOCUMENTS.—Accompanying the Plan shall be—

(1) a summary of the achievements of Federal efforts during the preceding fiscal year to develop technologies needed for deployment and full utilization of an advanced information infrastructure;

(2) an evaluation of the progress made toward achieving the goals and objectives of the Plan;

(3) a summary of problems encountered in implementing the Plan; and

(4) any recommendations regarding additional action or legislation which may be required to assist in achieving the purposes of this title.

(d) AGENCIES AND DEPARTMENTS.—*The Plan shall address, where appropriate, the relevant programs and activities of the following Federal agencies and departments:*

(1) The National Science Foundation.

(2) The Department of Commerce, particularly the National Institute of Standards and Technology, the National Oceanic and Atmospheric Administration, and the National Telecommunications and Information Administration.

(3) The National Aeronautics and Space Administration.

(4) The Department of Defense, particularly the Advanced Research Projects Agency.

(5) The Department of Energy.

(6) The Department of Health and Human Services, particularly the National Institutes of Health and the National Library of Medicine.

(7) The Department of the Interior, particularly the United States Geological Survey.

(8) The Department of Education.

(9) The Department of Agriculture, particularly the National Agricultural Library.

(10) Such other agencies and departments as the President or the Chairman of the Council considers appropriate.

(e) LIBRARY OF CONGRESS.—*In addition, the Plan shall take into consideration the present and planned activities of the Library of Congress, as deemed appropriate by the Librarian of Congress.*

(f) COUNCIL.—*The Council shall—*

(1) service as lead entity responsible for development of the Plan and interagency coordination of the Program;

(2) coordinate the high-performance computing research and development activities of Federal agencies and departments undertaken pursuant to the Plan and report at least annually to the President, through the Chairman of the Council, on any recommended changes in agency or departmental roles that are needed to better implement the Plan;

(3) review, prior to the President's submission to the Congress of the annual budget estimate, each agency and departmental budget estimate in the context of the Plan and make the results of that review available to the appropriate elements of the Executive Office of the President, particularly the Office of Management and Budget; and

(4) consult and ensure communication between Federal agencies and research, educational, and industry groups and State agencies conducting research and development on and using high-performance computing.

SEC. 303. DEFINITIONS.

As used in this title, the term—

(1) "broadband" means a transmission rate for digital information on a communications network which exceeds the maximum rate possible for transmission of digital information on normal copper telephone wires;

(2) "information infrastructure" means a network of communications systems and computer systems designed to exchange information among all citizens and residents of the United States;

(3) "Internet" means the network of interoperable and interconnected packet-switched data networks, whether provided by the public or private sector; and

(4) "National Challenge" means an application of high-performance computing and high-speed networking that will provide large economic and social benefits to a broad segment of the Nation's populace.

AMERICAN TECHNOLOGY PREEMINENCE ACT OF 1991

Section 104 of That Act

SEC. 104. NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY.

(a) through (d) * * *

(e) PILOT PROGRAM.—*(1)* Pursuant to the authorizations contained in subsections (a)(1)(I) and (b)(1)(I), the Secretary is authorized to pay the Federal share of the cost of establishing and carrying out a standards assistance pilot program under section 112 of the National Institute of Standards and Technology Authorization Act for Fiscal Year 1989 (15 U.S.C. 272 note). The purpose of the pilot program is to assist a country or countries that have requested assistance from the United States in the development of comprehensive industrial standards by providing the continuous presence of United States personnel on-site for a period of 2 or more years to provide such assistance and by providing, as necessary, additional technical support from within the Institute. Such funds shall be made available for such purpose only to the extent that **[**matching funds**]** *financial contributions deemed appropriate by the Secretary* are received by the National Institute of Standards and Technology from sources outside the Federal Government.

(2) As necessary and appropriate, the Institute shall expand the program established under section 112 of the National Institute of Standards and Technology Authorization Act for Fiscal Year 1989 (15 U.S.C. 272 note) by extending the existing program to include other countries that prefer to discuss their standards-related activities with official representatives of the Federal Government. The Institute may enter into additional contracts with non-Federal organizations representing United States-owned companies, as such term is defined in section 28(j)(2) of the National Institute of Standards and Technology Act (15 U.S.C. 278n(j)(2)). Such contracts shall require cost sharing between Federal and non-Federal sources for such purposes. I awarding such contracts, the Institute shall seek to promote and support the dissemination of United States technical standards to additional foreign countries and shall seek, as the Director deems appropriate, to promote the adoption of international standards supported by United States industry. The Institute and such contractors shall, in pursuing this mission, cooperate with governmental bodies, private organizations including standards-setting organizations and industry, and multinational institutions that promote economic development. The organizations receiving such contracts may establish training programs to bring to the United States foreign standards experts for the purpose of receiving in-depth training in the United States standards system.

(f) through (i) * * *

Section 201 of That Act

SEC. 201. EMERGING TECHNOLOGIES RESEARCH AND DEVELOPMENT.

(a) through (c) * * *

(d) Effective Date.—The amendments in subsection (c) shall take effect immediately upon enactment; however, the amendments shall not apply to applications submitted before the date of enactment of this Act, *except in the case of the amendment made by subsection (c)(6)(A)*.

(e) through (f) * * *

Section 508 of That Act

SEC. 508. STUDY OF TESTING AND CERTIFICATION.

(a) Contract With National Research Council.—Within 90 days after the date of enactment of this Act and within available appropriations, the Secretary shall enter into a contract with the National Research Council for a through review of international *standards development and international* product testing and certification issues. The National Research Council will be asked to address the following issues and make recommendations as appropriate:

(1) Current and potential future roles of the Federal Government in the development and promulgation of domestic and global product and process standards.

[(1)**]** *(2)* The impact on United States manufacturers, testing and certification laboratories, certification organizations, and other affected bodies of the European Community's plans for testing and certification of regulated and nonregulated products of non-European origin.

[(2)**]** *(3)* Ways for United States manufacturers to gain acceptance of their products in the European Community and in other foreign countries and regions.

[(3)**]** *(4)* The feasibility and consequences of having mutual recognition agreements between testing and certification organizations in the United States and those of major trading partners on the accreditation of testing and certification laboratories and on quality control requirements.

[(4)**]** *(5)* Information coordination regarding product acceptance and conformity assessment mechanisms between the United States and foreign governments.

[(5)**]** *(6)* The appropriate Federal, State, and private roles in coordination and oversight of testing, certification, accreditation, and quality control to support national and international trade.

(b) through (c) * * *